TM 11-5895-219-50

DEPARTMENT OF THE ARMY TECHNICAL MANUAL

DEPOT MAINTENANCE RADIO RECEIVER-SELECTORS R-196C/ARW-26Y AND R-196D/ARW-26Y

HEADQUARTERS, DEPARTMENT OF THE ARMY

JULY 1959

HEADQUARTERS,
DEPARTMENT OF THE ARMY

WASHINGTON 25, D. C., *31 July 1959*

TM 11-5895-219-50 (a reprint of an Air Force-Navy publication) is published for use of Army personnel.

[AG 413.44 (24 Jun 59)]

By Order of *Wilber M. Brucker*, Secretary of the Army:

L. L. LEMNITZER,
General, United States Army,
Chief of Staff.

Official:

R. V. LEE,
Major General, United States Army,
The Adjutant General.

Distribution:

Active Army:

ASA (2)
CNGB (1)
Tech Stf, DA (1) except
CsigO (10)
Tech Stf Bd (1)
USCONARC (5)
USA Arty Bd (1)
USA Armor Bd (1)
USA Armor Bd Test Sec (1)
USA Inf Bd (1)
USA Air Def Bd (1)
USA Air Def Bd Test Sec (1)
USA Abn & Elect Bd (1)
USA Avn Bd (1)
USA Arctic Test Bd (1)
US ARADCOM (2)
US ARADCOM Rgn (2)
Log Comd (5)
MDW (1)
Armies (1) except
First US Army (3)
USATC (2)
Fld Comd, Def Atomic Spt Agcy (5)
USASCS (25)
Gen Depots (2) except
Atlanta Gen Depot (none)
Sig Sec, Gen Depot (10)
Sig Depots (17)
USA Comm Agcy (2)
USA Sig Comm Engr Agcy (1)
Sig Lab (5)
Mil Dist (1)
USA Corps (Res) (1)
Sectors, USA Corps (Res) (1)
USASSA (15)
Mid-Western Rgn Ofc (USASSA) (1)
USA Sig Pubs Agcy (8)
USA Sig Msl Spt Agcy (2)
USA Elct PG (1)
USA Sig Eqp Spt Agcy (2)
USA Ord Msl Comd (3)

Units org under fol TOE:

11-587 (2)
11-592 (2)
11-597 (2)

NG: State AG (3).

USAR: None.

For explanation of abbreviations used, see AR 320-50.

☆U. S. GOVERNMENT PRINTING OFFICE: 1959—520790/433

TABLE OF CONTENTS

Section		Page
I	DESCRIPTION AND LEADING PARTICULARS	1
II	TEST EQUIPMENT AND SPECIAL TOOLS	5
III	MAINTENANCE BEYOND CAPABILITIES OF FIELD	6
IV	DISMANTLING AND DISASSEMBLY	6
V	CLEANING	12
VI	INSPECTION OF DISASSEMBLED EQUIPMENT	13
VII	REPAIR AND REPLACEMENT	16
VIII	REASSEMBLY AND TESTING OF SUBASSEMBLIES AND ASSEMBLIES	20
IX	REASSEMBLY AND TESTING OF COMPONENTS (Not Applicable)	20
X	FINAL REASSEMBLY	21
XI	INSPECTION, TESTING AND PACKAGING	22
XII	DIFFERENCE DATA SHEET	23
	RADIO RECEIVER-SELECTOR, R-196D/ARW-26Y	23

ILLUSTRATIONS

Figure No.	Title	Page
1-1.	Radio Receiver-Selector R-196C/ARW-26Y, Assembled View	ii
1-2.	Radio Receiver-Selector R-196C/ARW-26Y, Top View of Chassis	1
1-3.	Radio Receiver-Selector R-196C/ARW-26Y, Bottom View of Chassis	2
1-4.	Radio Frequency Tuning Unit, Assembled View	3
4-1.	Radio Receiver-Selector R-196C/ARW-26Y, Exploded View	7
4-2.	Panel and Chassis Assembly, Part No. 22710	8
4-3.	Radio Frequency Tuning Unit Assembly, Part No. 22714	10
4-4.	Tuning Unit Terminal Board Assembly, Part No. 22731	11
4-5.	Capacitor Terminal Board Assembly, Part No. 22716	11
4-6.	Chassis Terminal Board Assembly, Part No. 22729	12
6-1.	Inspection and Test of Relays	14
6-2.	JAN and RMA Color Codes for Capacitors and Resistors	15
7-1.	Removing and Replacing Radio Frequency Tuning Unit	18
12-1.	Radio Receiver-Selector R-196D/ARW-26Y, Assembled View	24
12-2.	Panel and Chassis Assembly, Part No. 22887	25
12-3.	Radio Frequency Tuning Unit Assembly, Part No. 22889	27
12-4.	Tuning Unit Terminal Board Assembly, Part No. 22890	28
12-5.	Chassis Terminal Board Assembly, Part No. 22885	28

TABLES

Table No.		Page
I	Equipment Characteristics for R-196C/ARW-26Y	4
II	Special Test Equipment Required for Overhaul	5
III	Equipment Characteristics for R-196D/ARW-26Y	23

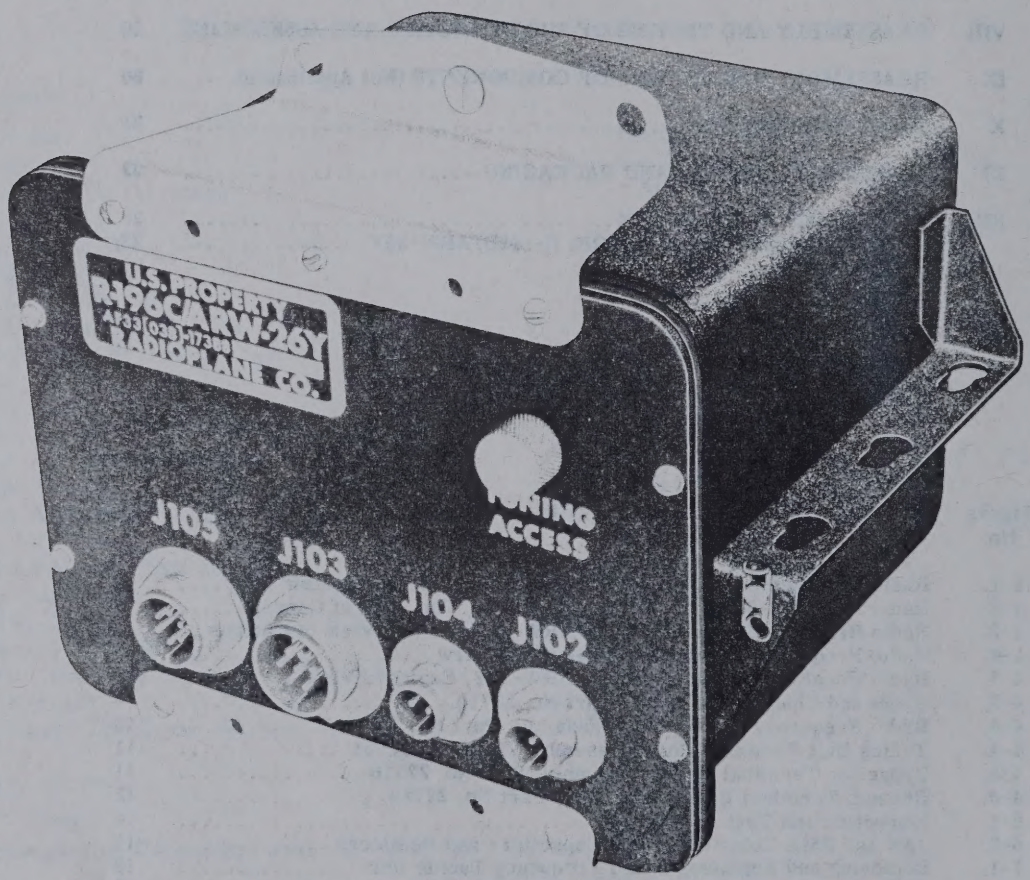


Figure 1-1. Radio Receiver-Selector R-196C/ARW-26Y, Assembled View

SECTION I

DESCRIPTION AND LEADING PARTICULARS

1-1. INTRODUCTION. (See figure 1-1.)

1-2. This publication comprises overhaul instructions for the Radio Receiver-Selector R-196C/ARW-26Y and R-196D/ARW-26Y, Contract No. AF33(038)17388, manufactured by Radioplane Company, Van Nuys, California.

1-3. This handbook contains descriptive data and illustrated instructions which are incorporated to facilitate overhaul of the subject equipment. Detailed information concerning test equipment, specialized maintenance, disassembly, cleaning, inspection, repair, reassembly and testing is also included.

1-4. PURPOSE OF EQUIPMENT.

1-5. The equipment is designed to function as a control receiver for radio controlled target drones. The receiver is employed in conjunction with associated ground control transmitting equipment and an airborne servo system to direct flight operation of the target drone within which it is installed. The purpose of the equipment is to relay flight control intelligence from the transmitter carrier to the servo system and thus provide remote flight control of the aerial target. The equipment can be employed to provide both out-of-sight flight control and in-sight flight operation of the target drone when used in conjunction with the proper type of servo system and a suitable tracking means.

1-6. OPERATIONAL THEORY.

1-7. The receiver has an r-f tuning range of 57 to 74 megacycles and is designed to receive within this tuning

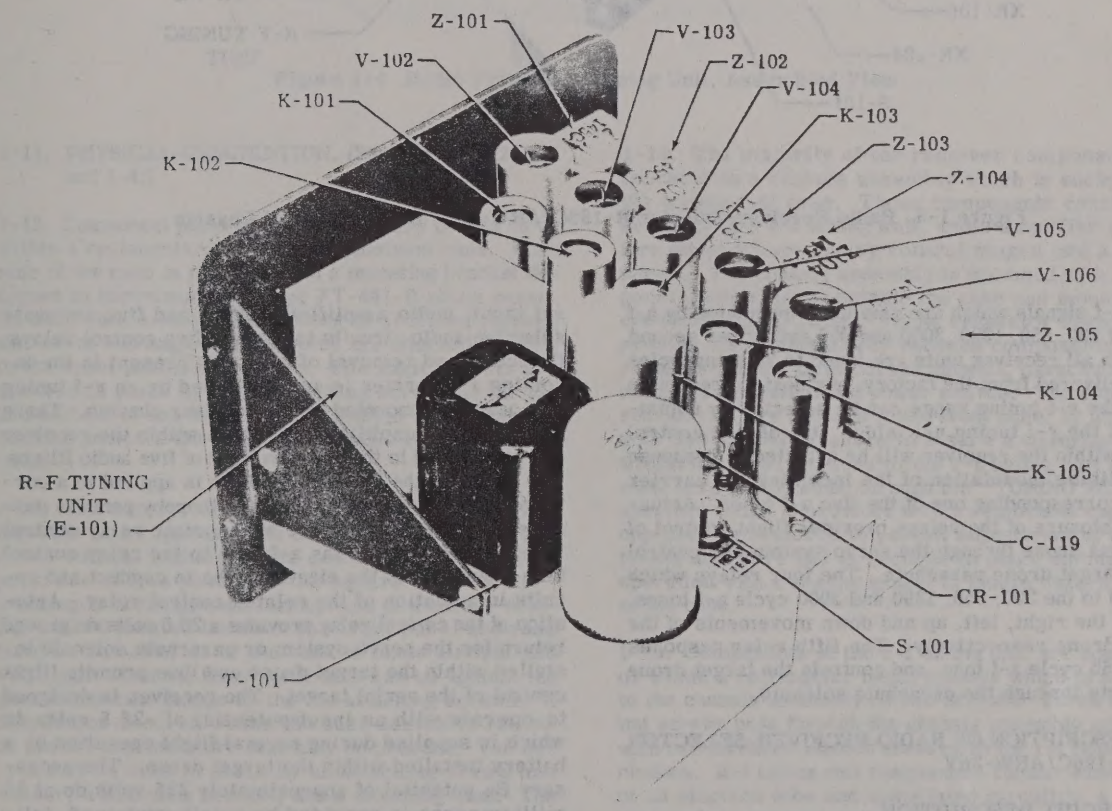


Figure 1-2. Radio Receiver-Selector R-196C/ARW-26Y, Top View of Chassis

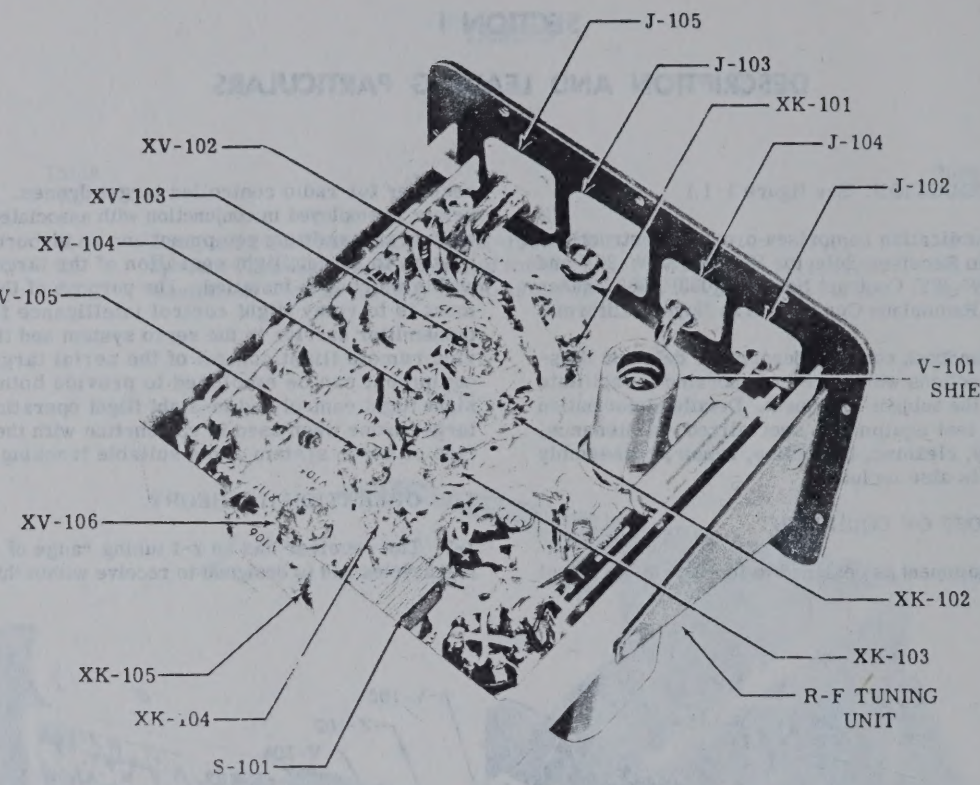


Figure 1-3. Radio Receiver-Selector R-196C/ARW-26Y, Bottom View of Chassis

range r-f signals which are amplitude modulated by a-f tones of 300, 650, 1390, 3000 and 955 cycles per second. Although all receiver units are tuned to 73 megacycles when delivered from the factory, any desired reception within the r-f tuning range can be selected by adjustment of the r-f tuning unit slug. One of five control relays within the receiver will be actuated in response to amplitude modulation of the incoming r-f carrier by the corresponding one of the five a-f tones. Actuation or closure of the relays provides flight control of the target drone through the servo system and control of the target drone parachute. The four relays which respond to the 300, 650, 1390 and 3000 cycle a-f tones, control the right, left, up and down movements of the target drone respectively. The fifth relay responds to the 955 cycle a-f tone, and controls the target drone parachute through the parachute solenoid.

1-8. DESCRIPTION OF RADIO RECEIVER-SELECTOR R-196C/ARW-26Y.

1-9. CIRCUIT DESCRIPTION.

1-10. The equipment consists basically of a super-regenerative receiver which is provided with a tuned r-f input, audio amplifier stages, and five separate selective audio circuits to operate five control relays. Detection and removal of a-f tones present in the incoming r-f carrier is accomplished by an r-f tuning unit assembly mounted on the receiver chassis. These a-f tones are amplified by circuits within the receiver and are applied to the common input of five audio filters. The output of the individual filters is applied to a corresponding relay control tube and thereby permits passage of the a-f tone to the appropriate relay control tube. Application of the a-f tone to the relay control tube input causes the electron tube to conduct and results in actuation of the related control relay. Actuation of the control relay provides a 26.5 volts dc ground return for the servo system or parachute solenoid installed within the target drone and thus permits flight control of the aerial target. The receiver is designed to operate with an input potential of +26.5 volts dc which is supplied during normal flight operation by a battery installed within the target drone. The necessary B+ potential of approximately 225 volts dc at 20 milliamperes is provided by a self-contained, full-wave, synchronous type vibrator power supply. Heater potentials are derived from the 26.5 volts dc input supply.

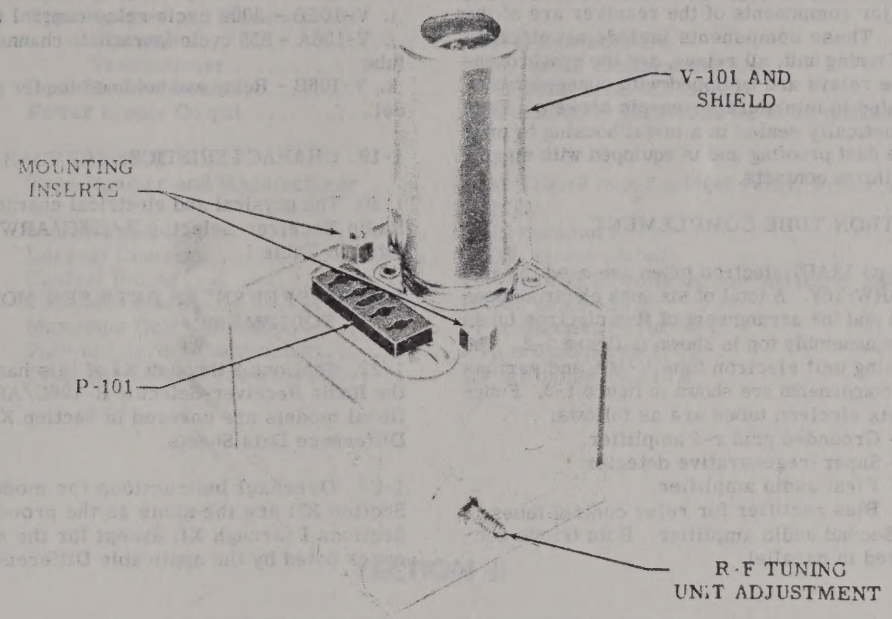


Figure 1-4. Radio Frequency Tuning Unit, Assembled View

1-11. PHYSICAL DESCRIPTION. (See figures 1-2, 1-3 and 1-4.)

1-12. Component parts of the receiver are housed on or within a rectangular, waterproof aluminum case. Each side of the case is provided with a mounting bracket designed to accommodate a Type FT-441-B shock mount. An alternate method of mounting is provided through the use of two angle mounts which are attached directly to the front panel of the case. The angle mounts are secured in place by three attaching screws at the top and bottom of the front panel. Design of the case or housing provides the unit with versatile mounting facilities.

1-13. The waterproof case is designed to permit immersion at an approximate depth of three feet in sea water without leaking. This depth is equivalent to a pressure of five pounds to the square inch. Waterproofing is accomplished through use of a rubber sealing gasket located between the front panel and case flange. The interior of the case is made airtight and watertight when the front panel is drawn up against the gasket and case flange by the ten attaching screws. A dehydrator secured within the case serves to reduce or absorb any moisture that may be present. The dehydrator is held in place by an attaching screw and washer, a mounting bracket, and a mounting stud. The dehydrator consists essentially of a transparent plastic cartridge which contains silica-gel crystals. A colored decal cemented to the cartridge is provided to determine exhaustion of the silica-gel.

1-14. The majority of the receiver components are mounted on a chassis assembly which is enclosed by the waterproof case. These components consist essentially of a r-f tuning unit, audio amplifier stages, five audio filters, relay control stages and a power supply. The chassis assembly is provided with a front panel which extends outside the case and mounts four connector receptacles. These connector receptacles provide circuit continuity between components of the receiver and the target drone antenna, parachute solenoid, servo system and power source. The connector receptacles are secured to the front panel by attaching nuts and sealing washers to insure a watertight seal within the case. Access to the r-f tuning unit adjustment screw is obtained through the "TUNING ACCESS" aperture which is provided with a removable cap. The cap may be removed to permit adjustment of the r-f tuning unit core and is secured in place during flight operation with a sealing gasket to insure waterproofing of the case.

1-15. Components of the r-f tuning unit are housed on or within a rectangular metal chassis which is secured to the chassis assembly by two screws. These attaching screws pass through the chassis assembly and mate with two threaded inserts secured to the r-f tuning unit chassis. R-f tuning unit components consist essentially of an electron tube and associated circuitry, a tuning core and a connector receptacle. (See figure 1-4.) The connector plug P-101 mates with a matching connector receptacle J-101 located on the chassis assembly when the r-f tuning unit is inserted into place. The r-f tuning

unit is provided with a removable cover secured by attaching screws to permit dustproofing of the interior.

1-16. All major components of the receiver are of the plug-in type. These components include all electron tubes, the r-f tuning unit, all relays, and the synchronous vibrator. The relays are equipped with connector pins and are mounted in miniature seven-pin sockets. Each relay is hermetically sealed in a metal housing to provide complete dust proofing and is equipped with single-pole, double-throw contacts.

1-17. ELECTRON TUBE COMPLEMENT.

1-18. JAN Type 12AU7 electron tubes are used through the R-196C/ARW-26Y. A total of six such electron tubes are employed and the arrangment of five electron tubes on the chassis assembly top is shown in figure 1-2. The single r-f tuning unit electron tube V-101 and various other circuit components are shown in figure 1-3. Functions of the six electron tubes are as follows:

a. V-101A - Grounded grid r-f amplifier.
b. V-101B - Super-regenerative detector.
c. V-102A - First audio amplifier.
d. V-102B - Bias rectifier for relay control tubes.
e. V-103 - Second audio amplifier. Both triode sections connected in parallel.
f. V-104A - 300 cycle relay control tube.
g. V-104B - 650 cycle relay control tube.
h. V-105A - 1390 cycle relay control tube.
i. V-105B - 3000 cycle relay control tube.
j. V-106A - 955 cycle (parachute channel) relay control tube.
k. V-106B - Relay and holding tube for parachute channel.

1-19. CHARACTERISTICS.

1-20. The physical and electrical characteristics of the Radio Receiver-Selector R-196C/ARW-26Y are tabulated in Table I.

1-21. DIFFERENCES BETWEEN MODELS OF THE EQUIPMENT.

1-22. Sections I through XI of this handbook apply to the Radio Receiver-Selector R-196C/ARW-26Y. Additional models are covered in Section XII by the use of Difference Data Sheets.

1-23. Overhaul Instructions for models included in Section XII are the same as the procedures given in Sections I through XI, except for the specific differences noted by the applicable Difference Data Sheets.

TABLE I. EQUIPMENT CHARACTERISTICS FOR R-196C/ARW-26Y

PHYSICAL CHARACTERISTICS	
Dimensions (overall)	Inches
Width	8-11/16
Height	5-5/8
Length	6-1/2
Total Weight	5.75 pounds
EQUIPMENT OPERATING RANGES	
Temperature	-25°C to +70°C (-13°F to +158°F)
Altitude	0 to 20,000 feet
FREQUENCY DATA	
R-F Tuning Range	57 to 74 megacycles
Preset Frequency	73 megacycles
Frequency Stability	0.25%
Sensitivity	10 microvolts
Selectivity	±1 megacycle
Band Width (r-f tuning unit)	2 megacycles at 20,000 microvolts, 75% modulation
SIGNAL CHARACTERISTICS	
Receiver Input	57 to 74 megacycle r-f signal, amplitude modulated by a-f signal of 300, 650, 1390, 3000 or 955 cycles per second
Input Impedance	62 ohms
Receiver Output	Mechanical closure of relays to provide a ground return for +26.5 volts dc to servo control mechanisms
POWER REQUIREMENTS	
Input Voltage	26.5 volts dc
Total Current Requirements at	
Rated Voltage	0.75 ampere
Heater	0.45 ampere
Power Supply	0.3 ampere
Total Normal Operating Current	0.75 ampere
Maximum Starting Current	1.1 amperes

TABLE I. EQUIPMENT CHARACTERISTICS FOR R-196C/ARW-26Y (cont)

POWER SUPPLY DATA	
Type	Full-wave, synchronous vibrator and transformer
Type Number and Manufacturer	
Vibrator	V6874, Oak Mfg. Co.
Transformer	6918, Triad Transformer Co.
Input Requirements	+26.5 volts dc at 0.3 ampere
Power Supply Output	Approximately +225 volts dc at 20 milliamperes
RELAY CHARACTERISTICS	
Type Number and Manufacturer	XSM-1135-2 super midget relay, Potter and Brumfield Mfg. Co.
Socket Type	7 pin miniature
Internal Contacts	SPDT, silver plated
Contact Rating	1 ampere at 24 volts dc non-inductive load
Coil Resistance	10,000 ohms ±10%
Maximum Coil Current	14 milliamperes for 90°C
Pull-in Current (increasing)	2.75 millamperes ±10%
Drop-out Current (decreasing)	1.5 millamperes ±10%

SECTION II

TEST EQUIPMENT AND SPECIAL TOOLS

2-1. TEST EQUIPMENT LIST.

2-2. All items of special test equipment required for overhaul of the Radio Receiver-Selector R-196C/ARW-26Y, and not shown in the Handbook of Service Instructions for Radio Receiver-Selector R-196C/ARW-26Y and R-196D/ARW-26Y are listed in Table II.

2-3. TOOLS LIST.

2-4. No special tools are required for overhaul of the R-196C/ARW-26Y. All overhaul operations can be performed with the aid of common handtools. For information concerning these handtools, refer to the service handbook.

TABLE II. SPECIAL TEST EQUIPMENT REQUIRED FOR OVERHAUL

Figure and Index No.	Name	Manufacturers or AN. Type Designation	Alternate	Use
	Condenser Tester	Oxford-Tartac CT-400	----	Check capacitance
6-1	Lamps (2) 28 volts dc	Tung-Sol #303	----	Drop-out and pull-in lamps
6-1	Potentiometer 100K	Allen-Bradley 5169 (D6)	----	Vary relay current

SECTION III

MAINTENANCE BEYOND CAPABILITIES OF FIELD

3-1. GENERAL.

3-2. This section contains data which will aid depot facilities to accomplish heavy maintenance and repair on the Radio Receiver-Selector R-196C/ARW-26Y beyond the capabilities of field facilities and to determine the extent of overhaul required prior to disassembly. The Handbook of Service Instructions for Radio Receiver-Selector R-196C/ARW-26Y and R196D/ARW-26Y contains information which will permit localization of equipment malfunctions and maladjustments by field personnel to circuits within the equipment and to specific parts within the circuits. Field personnel can then check individual circuit parts by the substitution method. This service information and method will also suffice for overhaul personnel and will obviate the need for further service procedures. However, overhaul personnel can check individual circuit parts through the use of test equipment and need not employ the substitution method if desired.

3-3. Section VI of this publication outlines detailed procedures for inspection and check of individual circuit parts. Information is included for the majority circuit parts and it is intended that the information be used as a supplement to the service handbook. If it becomes necessary to service an inoperative unit at the overhaul level, refer to the Handbook of Service Instructions for Radio Receiver-Selector R-196C/ARW-26Y and R-196D/ARW-26Y and employ the trouble analysis information contained therein to localize the malfunction. Once the malfunction has been localized to a specific circuit part, the part can be tested as outlined in Section VI of this publication. Parts which prove to be defective can then be repaired or replaced as indicated in Section VII of this publication. The need for further exhaustive service procedures by overhaul personnel is precluded by the relatively simple nature of the equipment.

SECTION IV

DISMANTLING AND DISASSEMBLY

4-1. GENERAL.

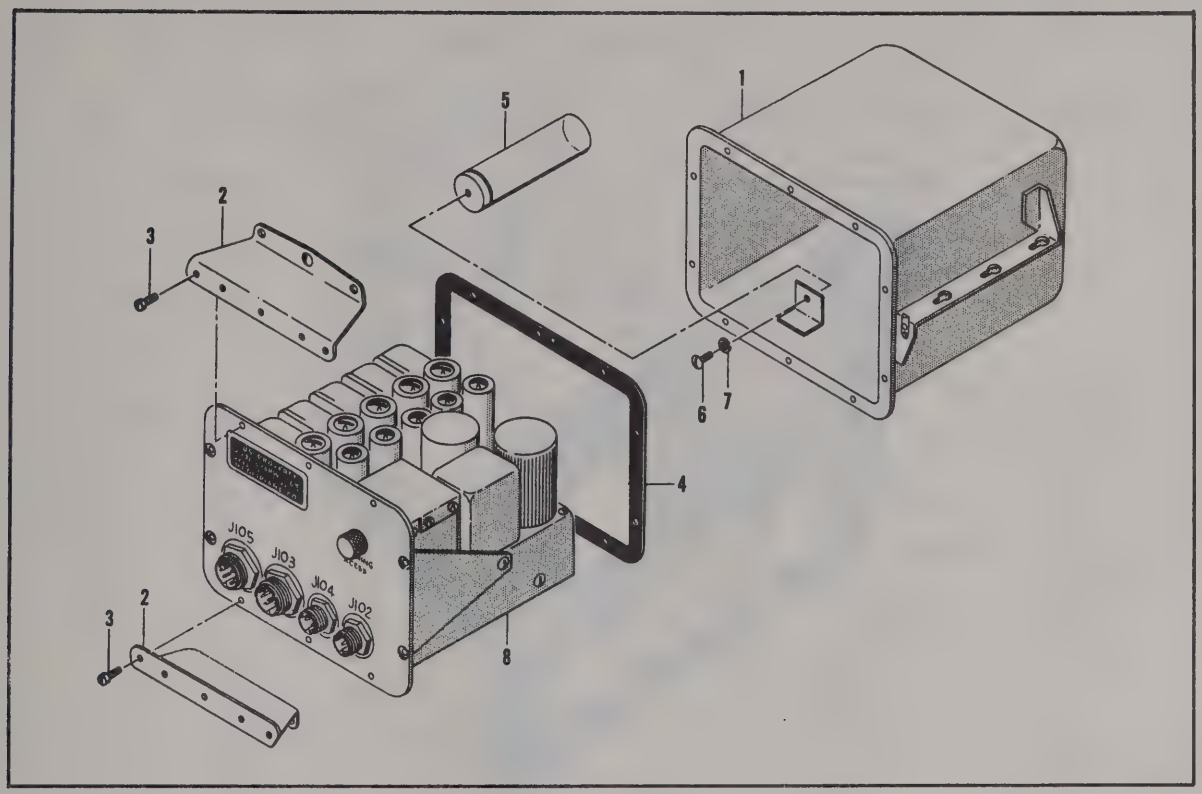
4-2. This section describes the procedures necessary for removal of the Radio Receiver-Selector R-196C/ARW-26Y from its packing case and for disassembly of the unit into detail parts preparatory to overhaul. Figures 4-1 through 4-6 are provided to serve as a guide when performing disassembly of the R-196C/ARW-26Y and the subsequent steps can be used as a supplement to these illustrations. Disassembly of the unit can be accomplished by removing parts in the order of index numbers assigned to the parts on the illustrations. Complete disassembly of the unit is not anticipated and detailed instructions are provided only where it is felt that the disassembly method is not obvious.

4-3. UNPACKING.

4-4. Remove the unit from its packing case as follows:
a. Cut the metal straps which secure the packing case.
b. Employ a nail puller and remove the nails which secure the packing case lid. Carefully remove the lid.
c. Lift out the individual cardboard cartons which house the separate units.
d. Remove the paper tape and open the cardboard carton. Carefully remove the first layer of fiber batting.
e. Open the waterproof barrier if packed for export shipment. Remove the inside layer of fiber batting.
f. Carefully lift the unit from the carton and internal wrappings. Check the contents of the carton against the packing slips.

4-5. DISASSEMBLY.

4-6. Disassemble the R-196C/ARW-26Y as follows:
a. Place the unit on a suitable work bench.
b. (See figure 4-1.) Remove the ten attaching screws (3) and withdraw case assembly (1), mounting (2) and gasket (4) from the panel and chassis assembly (8).
c. Dehydrator (5) can be removed from the case assembly (1) by removing screw (6) and washer (7).
d. (See figure 4-2.) Electron tubes (2, 3, 4, 5 and 6) and relays (8, 9, 10, 11 and 12) are protected by shields (1 and 7). These shields must be rotated counterclockwise and lifted to effect removal. The electron tubes and relays should then be extracted by use of a miniature electron tube puller.
e. Vibrator (13) can be removed simply by pulling upward on the vibrator while holding the chassis (57).
f. Remove the r-f tuning unit (14) by extracting screws (15) and lifting the r-f tuning unit from the chassis (57) top.
g. Unsolder electrical leads to terminals of transformer (19) and unsolder choke (16) and capacitor (17).



Index	Description	Reference Designation	Index	Description	Reference Designation
1.	Case Assy	A-101	5.	Dehydrator	MS-101
2.	Mounting		6.	Screw	
3.	Screw		7.	Washer	
4.	Gasket	A-106	8.	Panel and Chassis Assy	

Figure 4-1. Radio Receiver-Selector R-196C/ARW-26Y, Exploded View

Remove attaching nuts, washers, terminal board (18) and terminal (20). Lift transformer (19) from the chassis (57) top.

NOTE

All electrical leads attached to any part which is removed should be tagged prior to removal. This action will facilitate replacement and minimize the possibility of errors in wiring.

h. Filters (23, 24, 25, 26 and 27) can be extracted from the chassis (57) top by removing attaching nuts, washers and terminals (28).

i. Remove attaching screws, nuts, washers, spacers, and lift board assembly (35) from the chassis (57) bottom.

j. Remove attaching screws, nuts, washers, spacers, and lift board assembly (36) from the chassis (57) bottom.

k. Connector (37) can be extracted from the chassis (57) bottom by removing attaching screws, nuts, and washers.

l. Electron tube and relay sockets (38, 39, 40, 41, 42, 43, 44, 45, 46 and 47) can be separated from the chassis (57) when the attaching rivets are removed.

m. Socket (49) can be extracted from the chassis (57) bottom by removing attaching screws, nuts, washers and spacers.

n. Connectors (52, 53, 54, and 55) can be separated from panel assembly (56) when attaching nuts and gaskets are removed.

o. Panel assembly (56) can be separated from chassis (57) when attaching screws are removed from inserts. Inserts need not be removed from chassis (57).

p. (See figure 4-3.) Electron tube (2) is protected by shield (1) which must be rotated counterclockwise and lifted to effect removal. Electron tube (2) should then be extracted by use of a miniature electron tube puller.

q. Cover (3) must be separated from chassis (18) by removing screws (4) to gain access to the r-f tuning unit interior.

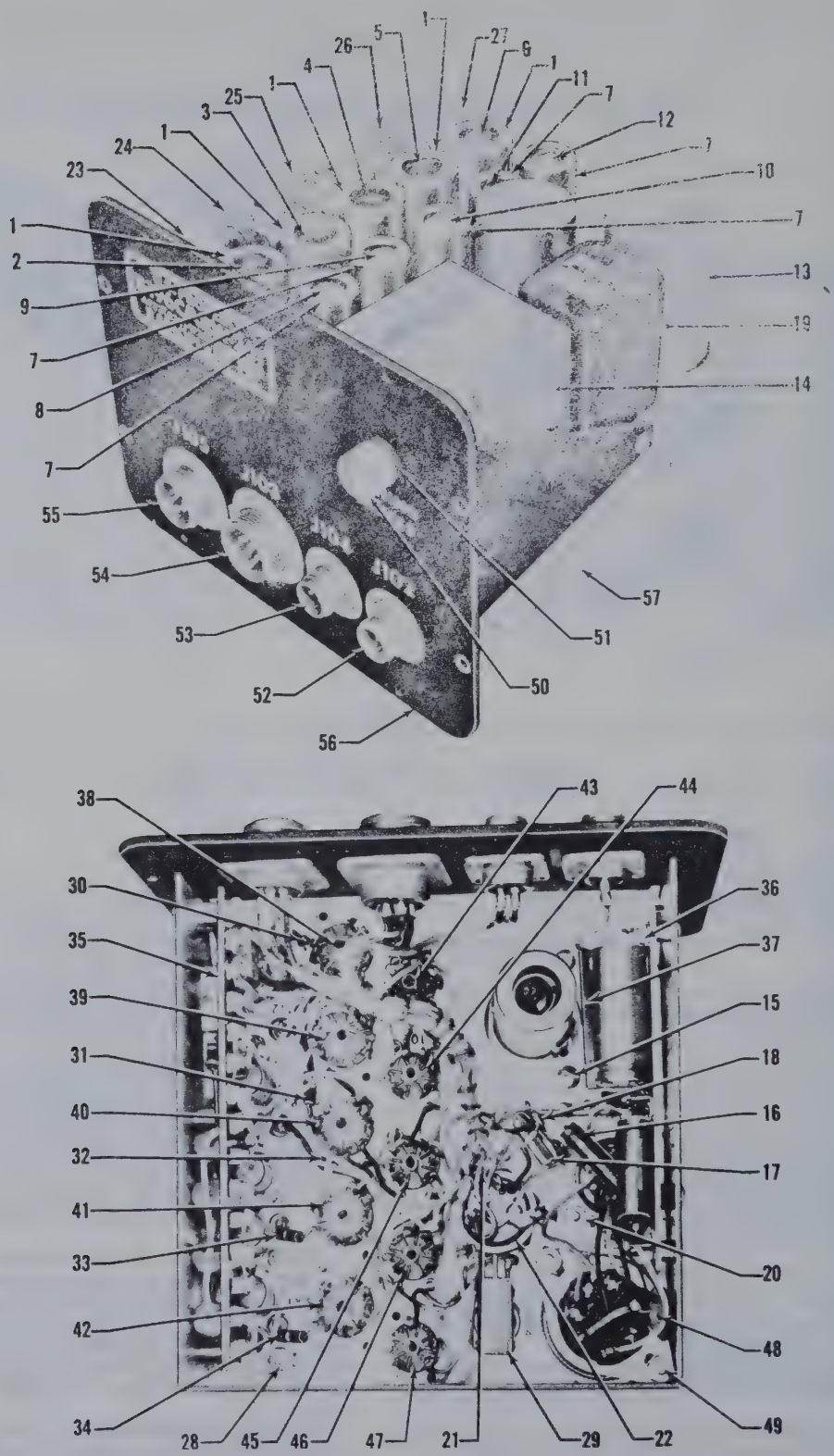


Figure 4-2. Panel and Chassis Assembly, Part No. 22710

KEY TO FIGURE 4-2

Index	Description	Reference Designation
1.	Shield	E-102
2.	Tube	V-102
3.	Tube	V-103
4.	Tube	V-104
5.	Tube	V-105
6.	Tube	V-106
7.	Shield	E-103
8.	Relay	K-101
9.	Relay	K-102
10.	Relay	K-103
11.	Relay	K-104
12.	Relay	K-105
13.	Vibrator	CR-101
14.	Tuning Unit Assy	E-101
15.	Screw	
16.	Choke	L-104
17.	Capacitor	C-125
18.	Board	TB-101
19.	Transformer	T-101
20.	Terminal	E-107
	Nut	
	Washer	
21.	Resistor	R-119
22.	Capacitor	C-119
23.	Filter	Z-101
24.	Filter	Z-102
25.	Filter	Z-103
26.	Filter	Z-104
27.	Filter	Z-105
28.	Terminal	E-107
	Nut	
	Washer	
29.	Switch	S-101
30.	Resistor	R-111
31.	Resistor	R-112
32.	Resistor	R-113
33.	Resistor	R-114
34.	Resistor	R-115
35.	Board Assy	E-105
	Screw	
	Nut	
	Washer	
	Spacer	H-103
36.	Board Assy	E-106
	Screw	
	Nut	
	Washer	
	Spacer	H-105
37.	Connector	J-101
	Screw	
	Nut	
	Washer	
38.	Socket	XV-102
39.	Socket	XV-103
40.	Socket	XV-104
41.	Socket	XV-105
42.	Socket	XV-106
43.	Socket	XK-101
44.	Socket	XK-102
45.	Socket	XK-103
46.	Socket	XK-104
47.	Socket	XK-105
48.	Capacitor	C-126
49.	Socket	XCR-101
	Screw	
	Nut	
	Washer	
	Spacer	H-104
50.	Cap	A-107
51.	Gasket	A-108
52.	Connector	J-102
	Nut	
	Gasket	A-109
53.	Connector	J-104
	Nut	
	Gasket	A-109
54.	Connector	J-103
	Nut	H-101
	Gasket	A-110
55.	Connector	J-105
	Nut	H-102
	Gasket	A-111
56.	Panel Assy	A-102
	Screw	
	Insert	H-107
57.	Chassis	A-103

r. Core (11) can be separated from chassis (18) by removing spring (9) and unscrewing bearing (10).

s. Remove attaching screws, nuts, washers, spacers, and lift board assembly (12) and terminal (13) from the chassis (18) interior.

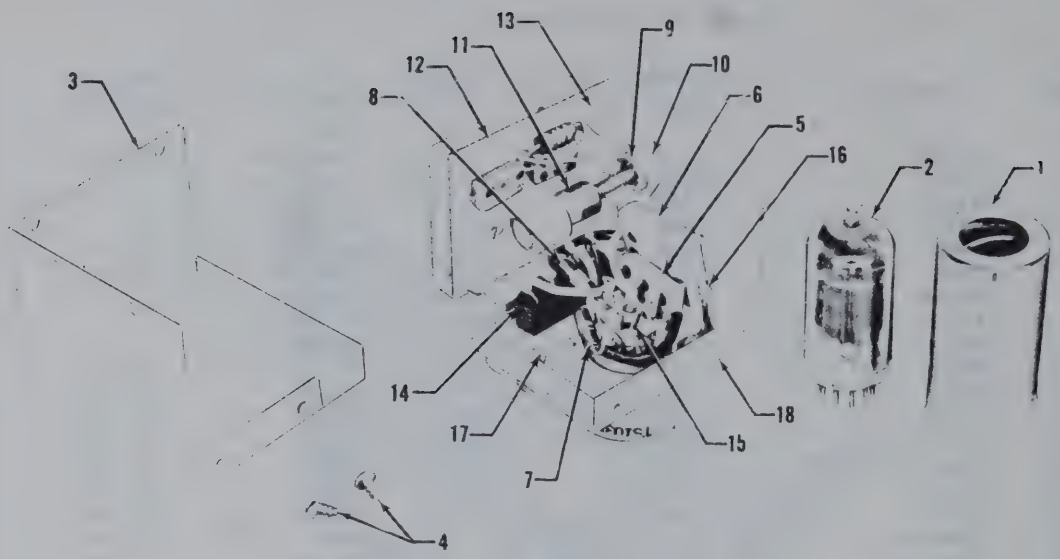
t. Connector (14) can be separated from chassis (18) by removing attaching screws, nuts and washers.

u. Socket (15) and terminal (16) can be extracted from chassis (18) when the attaching rivets are removed. Inserts (17) need not be removed from chassis (18).

v. (See figure 4-4.) Individual electronic parts can be removed from board and eyelet assembly (10) by unsoldering the respective leads.

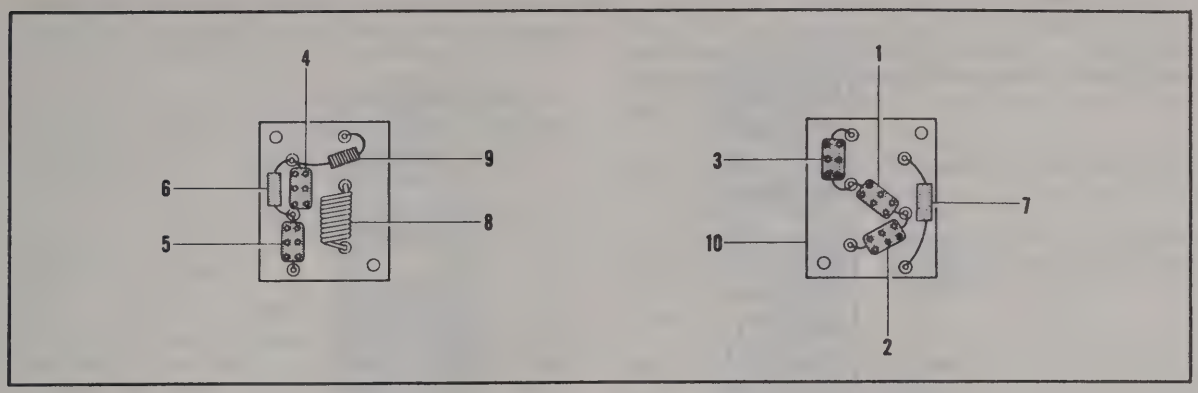
w. (See figure 4-5.) Individual capacitors can be removed from board and lug assembly (4) by unsoldering the respective leads.

x. (See figure 4-6.) Individual electronic parts can be removed from board and lug assembly (24) by unsoldering the respective leads. This completes disassembly of the R-196C/ARW-26Y.



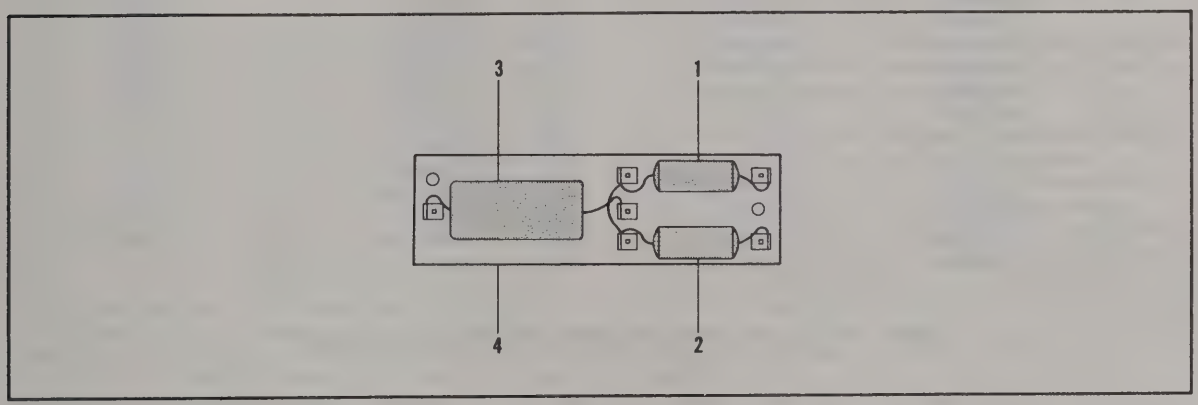
Index	Description	Reference Designation
1.	Shield	E-102
2.	Tube	V-101
3.	Cover	A-105
4.	Screw	
5.	Capacitor	C-101
6.	Capacitor	C-107
7.	Resistor	R-101
8.	Coil	L-102
9.	Spring	A-114
10.	Bearing	A-113
11.	Core	A-112
12.	Board Assy	E-104
13.	Terminal	E-107
	Screw	
	Nut	
	Washer	
	Spacer	H-106
14.	Connector	P-101
	Screw	
	Nut	
	Washer	
15.	Socket	XV-101
16.	Terminal	E-107
17.	Insert	H-108
18.	Chassis	A-104

Figure 4-3. Radio Frequency Tuning Unit Assembly, Part No. 22714



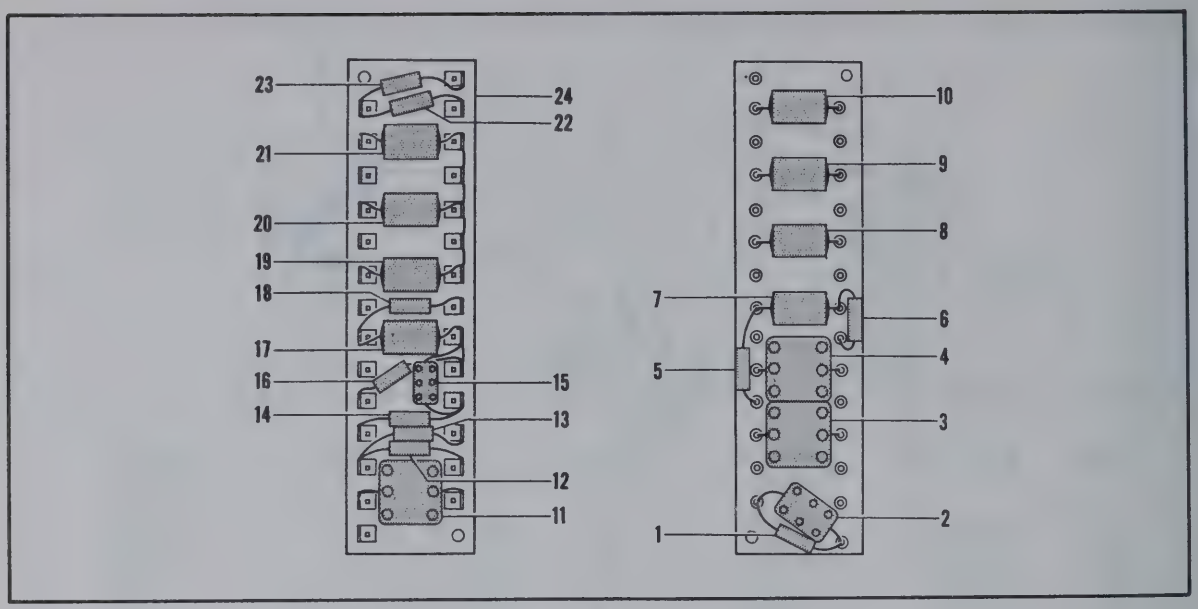
Index	Description	Reference Designation	Index	Description	Reference Designation
1.	Capacitor	C-102	6.	Resistor	R-102
2.	Capacitor	C-103	7.	Resistor	R-103
3.	Capacitor	C-104	8.	Coil	L-101
4.	Capacitor	C-105	9.	Coil	L-103
5.	Capacitor	C-106	10.	Board and Eyelet Assy	

Figure 4-4. Tuning Unit Terminal Board Assembly, Part No. 22731



Index	Description	Reference Designation	Index	Description	Reference Designation
1.	Capacitor	C-120	3.	Capacitor	C-123
2.	Capacitor	C-121	4.	Board and Lug Assy	

Figure 4-5. Capacitor Terminal Board Assembly, Part No. 22716



Index	Description	Reference Designation	Index	Description	Reference Designation
1.	Resistor	R-104	13.	Resistor	R-105
2.	Capacitor	C-124	14.	Resistor	R-106
3.	Capacitor	C-109	15.	Capacitor	C-110
4.	Capacitor	C-111	16.	Resistor	R-108
5.	Resistor	R-107	17.	Capacitor	C-112
6.	Resistor	R-109	18.	Resistor	R-110
7.	Capacitor	C-113	19.	Capacitor	C-114
8.	Capacitor	C-115	20.	Capacitor	C-116
9.	Capacitor	C-117	21.	Capacitor	C-118
10.	Capacitor	C-122	22.	Resistor	R-117
11.	Capacitor	C-108	23.	Resistor	R-116
12.	Resistor	R-118	24.	Board and Lug Assy	

Figure 4-6. Chassis Terminal Board Assembly, Part No. 22729

SECTION V

CLEANING

5-1. GENERAL.

5-2. Cleaning of the components and parts of the equipment will be accomplished with proper materials and solvents. A sufficient amount of lint-free dry cloth should be available, as well as carbon tetrachloride, Federal Specification O-C-141, and a small bristle brush for reaching narrow and normally inaccessible areas of the chassis and parts.

5-3. Inflammables such as gasoline or dry-cleaning solvent will not be used for any cleaning purpose. Only water and carbon tetrachloride will be used where applicable.

5-4. LUBRICATION.

5-5. No lubrication is required for any component of the R-196C/ARW-26Y equipment.

5-6. CLEANING.

5-7. Tubes will be cleaned with a clean, damp, dust-free cloth, and finished with dry cloth. Dirty pins and

sockets will be cleaned carefully with a cloth moistened with carbon tetrachloride.

5-8. Capacitors found to be dirty will be cleaned with a cloth moistened with carbon tetrachloride by removing foreign matter from surface, bushings, terminals, and connections. Finish with a dry cloth.

5-9. Resistors will be cleaned by removing dirt with a dry cloth. If necessary, apply carbon tetrachloride, and finish with a dry cloth.

5-10. Transformers, audio filters, and coils will be cleaned by removing dust and dirt. Employ a cloth moist with carbon tetrachloride for such cleaning. To prevent possible flash-over, clean all dust, dirt, and moisture from between terminals. Finish all surfaces with a dry cloth.

5-11. Wiring and connectors will be cleaned of dirt and corrosion. To clean a corroded connection thoroughly, remove the connection and use a brush dipped in carbon tetrachloride. Finish off with a dry cloth.

5-12. Terminal boards and surfaces will be cleaned of dust, dirt, and moisture by using a dry cloth.

5-13. The vibrator power supply and its component parts will be cleaned in the same manner, using a cloth moistened with carbon tetrachloride to remove dirt and dust.

5-14. The radio frequency tuning unit will be treated as a separate chassis, and cleaning of the unit will follow the same methods outlined above for the main chassis and its component parts.

SECTION VI

INSPECTION OF DISASSEMBLED EQUIPMENT

6-1. GENERAL.

6-2. This section describes the procedures necessary for inspection and test of Radio Receiver-Selector R-196C/ARW-26Y detail parts. Although all detail parts of the equipment should be inspected at the time of overhaul, the detail parts need not be tested unless they are suspected of being defective. As previously stated in Section III of this publication, the need for test of detail parts can best be ascertained by reference to the Handbook of Service Instructions for Radio Receiver-Selector R-196C/ARW-26Y and R-196D/ARW-26Y. The service handbook outlines test of detail parts by the substitution method. This method can also be employed by overhaul personnel and may prove practical since the majority of R-196C/ARW-26Y detail parts can not be repaired and must be substituted at both the field maintenance and overhaul levels. However, this section describes methods which will enable overhaul personnel to test detail parts through the use of test equipment.

6-3. INSPECTION AND TEST.

6-4. The subsequent paragraphs outline procedures which can be employed to test the detail parts and to ascertain their suitability for further use. Figures 6-1 and 6-2 are provided as an aid to overhaul personnel when performing test of the detail parts and are to be used as a supplement to the subsequent paragraphs.

6-5. INSPECTION AND TEST OF ELECTRON TUBES. Inspect and test the electron tubes as follows:

a. Inspect all electron tubes for evidence of broken envelopes and for bent, broken or damaged contact pins.

b. Test all electron tubes on a suitable electron tube tester such as is listed in the Handbook of Service Instructions for Radio Receiver-Selector R-196C/ARW-26Y and R-196D/ARW-26Y.

c. Replace any weak, shorted, microphonic or otherwise defective electron tubes with electron tubes which are known to be in good operating condition.

6-6. INSPECTION AND TEST OF RELAYS. (See figure 6-1.) Inspect and test the relays as follows:

a. Inspect all relays for evidence of broken envelopes and for bent, broken or damaged contact pins.

b. Employ a suitable ohmmeter such as is listed in the Handbook of Service Instructions for Radio Receiver-Selector R-196C/ARW-26Y and R-196D/ARW-26Y and check coil resistance of each relay. Connect the ohmmeter to pins 1 and 7 on the relay and obtain a resistance indication of 10,000 ohms plus or minus 10 percent.

c. Connect each relay to the test configuration shown in figure 6-1. Adjust potentiometer R1 to provide maximum resistance and apply primary power as indicated. The drop-out lamp should illuminate and remain illuminated to indicate that the relay under test is in the de-energized condition.

d. Slowly decrease the resistance of potentiometer R1 until the drop-out lamp is extinguished and the pull-in lamp is illuminated. Note the current indicated by milliammeter M1 at the exact instant the pull-in lamp is illuminated. This is the relay pull-in point and the indicated current should be 2.75 milliamperes plus or minus 10 percent.

e. Slowly increase the resistance of potentiometer M1 until the pull-in lamp is extinguished and the drop-out lamp is illuminated. Note the current indicated by milliammeter M1 at the exact instant the drop-out lamp is illuminated. This is the relay drop-out point and the indicated current should be 1.5 milliamperes plus or minus 10 percent.

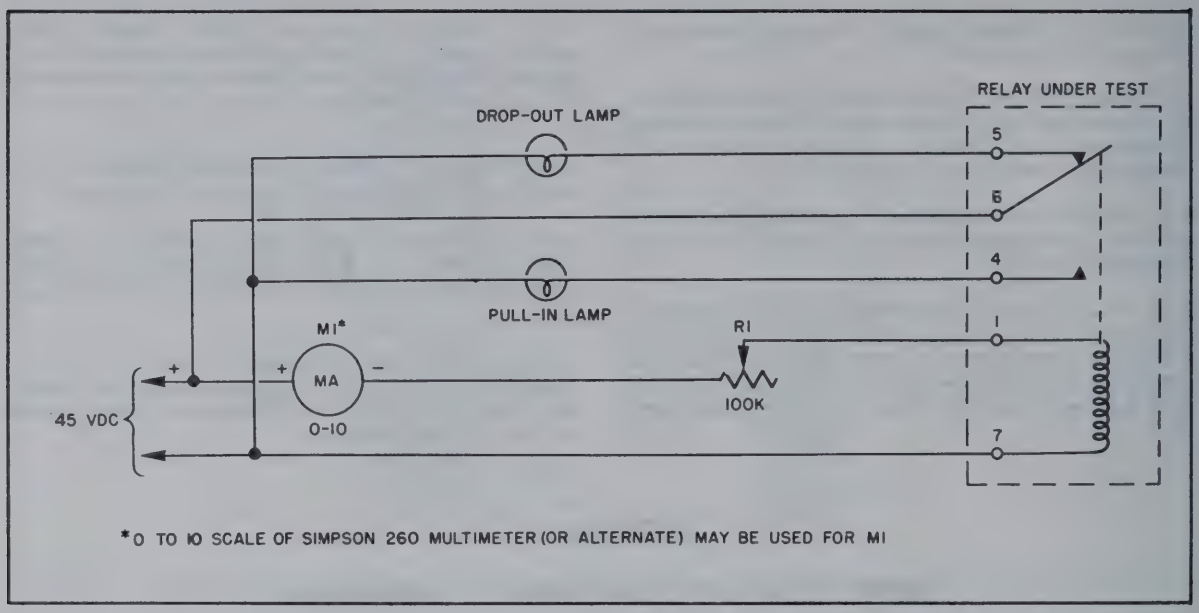


Figure 6-1. Inspection and Test of Relays

NOTE

Carefully observe the indicator lamps for signs of relay chatter or defective contacts as the drop-out and pull-in points are reached. Such chatter will usually be evidenced by excessive flickering of the indicator lamps as the drop-out and pull-in points are approached.

f. This completes inspection and test of the relays. Any relay which proves to be defective must be replaced with a relay which is known to be in good operating condition.

6-7. INSPECTION AND TEST OF CAPACITORS. Inspect and test the capacitors as follows:

a. Inspect all capacitors for evidence of loose or broken terminals and wire leads, leakage of insulating or electrolytic compound, and other signs of physical damage.

b. Employ a suitable capacitance checker such as listed in Table II and check all capacitors for opens, shorts, leakage and proper capacitance value.

c. The capacitors may be removed from the receiver for check or may be checked while installed by unsoldering one of the corresponding leads. Any capacitor which proves to be defective must be replaced with a capacitor which is known to be in good condition.

6-8. INSPECTION AND TEST OF RESISTORS. Inspect and test the resistors as follows:

a. Inspect all resistors for evidence of loose or broken terminals and wire leads, burned or swollen resistor bodies (evidence of excessive current flow), and other signs of physical damage.

b. Employ a suitable ohmmeter such as is listed in the Handbook of Service Instructions for Radio Receiver-Selector R-196C/ARW-26Y and R-196D/ARW-26Y, and check all resistors for opens and proper resistance value.

c. The resistors may be removed from the receiver for check or may be checked while installed by unsoldering one of the corresponding leads. Any resistor which proves to be defective must be replaced with a resistor which is known to be in good condition.

NOTE

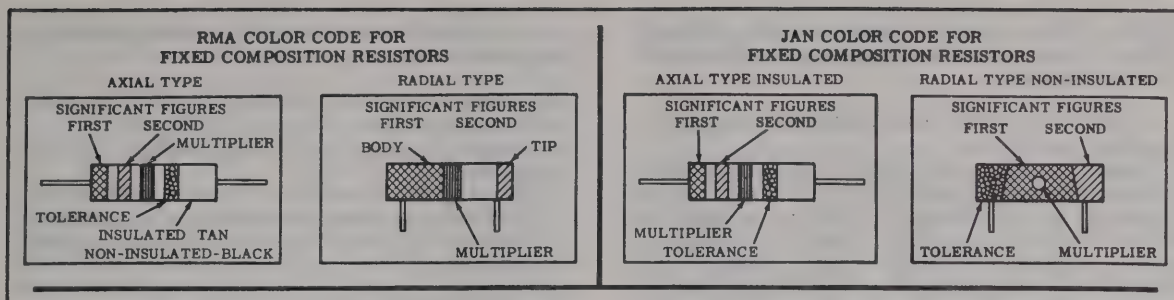
A JAN and RMA color code chart is provided in figure 6-2 and can be employed by overhaul personnel to identify values and tolerances of resistors and capacitors. The values for capacitors not provided with color codes are marked on such capacitors.

6-9. INSPECTION AND TEST OF INDUCTANCES L-101, L-102, L-103 AND L-104. Inspect and test the inductances as follows:

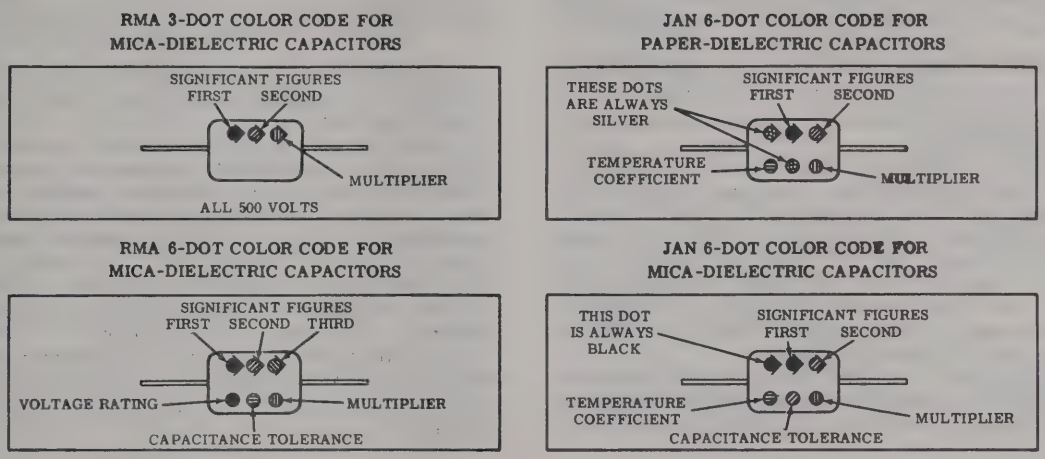
a. Inspect all inductances for evidence of loose or broken terminals and wire leads, burned or broken coil turns, and other signs of physical damage.

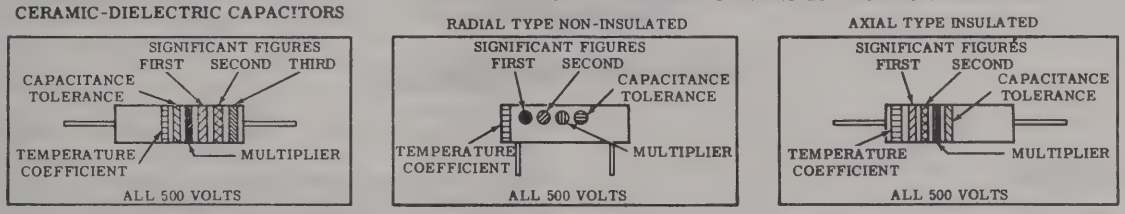
b. Employ a suitable ohmmeter such as is listed in the Handbook of Service Instructions for the Radio Receiver-Selector R-196C/ARW-26Y and R-196D/ARW-26Y and check all inductances for open turns or high resistance solder connections. The resistance values for each of the inductances are in the order of a few ohms and will vary from one unit to another. However, an excessively high resistance or a value of infinity usually indicates broken coil turns.

c. The inductances may be removed from the receiver for check or may be checked while installed by unsoldering one of the corresponding leads. Any inductance which proves to be defective must be replaced



CAPACITOR COLOR CODE





RESISTORS				CAPACITORS				
				MULTIPLIER				
TOLERANCE	MULTIPLIER	SIGNIFICANT FIGURE	COLOR	RMA MICA AND CERAMIC-DIELECTRIC	JAN MICA AND PAPER-DIELECTRIC	JAN CERAMIC DIELECTRIC	VOLTAGE RATING	TEMPERATURE COEFFICIENT
	1	0	BLACK	1	1	1		A
	10	1	BROWN	10	10	10	100	B
	100	2	RED	100	100	100	200	C
	1,000	3	ORANGE	1,000	1000	1000	300	D
	10,000	4	YELLOW	10,000			400	E
	100,000	5	GREEN	100,000			500	F
	1,000,000	6	BLUE	1,000,000			600	G
	10,000,000	7	VIOLET	10,000,000			700	
	100,000,000	8	GRAY	100,000,000		0.01	800	
	1,000,000,000	9	WHITE	1,000,000,000		0.1	900	
5	0.1		GOLD	0.1	0.1		1000	
10	0.01		SILVER	0.01	0.01		2000	
20			NO COLOR				500	

RMA: RADIO MANUFACTURERS ASSOCIATION JAN: JOINT ARMY-NAVY

Figure 6-2. JAN and RMA Color Codes for Capacitors and Resistors

with an inductance which is known to be in good condition or must be repaired as outlined in Section VII of this publication.

6-10. INSPECTION OF DEHYDRATOR. Inspect the dehydrator as follows:

a. Inspect the silica-gel crystals to determine their remaining activity. Compare the color of the crystals with the colors indicated on the decal to determine the amount of moisture absorbing activity remaining in the crystals. A deep blue indicates fully activated or dry silica-gel. A light pink color indicates that the silica-gel has absorbed enough moisture to be ineffective.

b. The dehydrator must be replaced or the silica-gel crystals reactivated as indicated in Section VII if the condition of the crystals is found to be unsatisfactory.

6-11. INSPECTION AND TEST OF TRANSFORMERS. Inspect and test the transformers as follows:

a. Inspect all terminals for evidence of broken or loose connections and leads.

b. Employ a suitable ohmmeter, such as is listed in Table II and check for proper resistance values at all terminals. Also check for open windings and for shorts between windings. The resistance across the primary of T-101 is approximately 21 ohms and secondary resistance is approximately 210 ohms. The resistance from the center tap of either the primary or secondary winding to each winding end should be approximately one half the total winding resistance.

c. Transformer winding resistance can best be checked while installed by unsoldering the transformer leads. The transformer must be replaced with one which is known to be in good condition if it proves defective by resistance check.

6-12. INSPECTION AND TEST OF AUDIO FILTERS. Inspect and test the audio filters as follows:

a. Inspect all terminals for evidence of broken or loose connections.

b. Test of the audio filters should be accomplished when the filter is installed and operating as part of the circuit. A procedure for the localization of trouble to specific audio filters and a test of the filters is outlined in the Handbook of Service Instructions for the R-196C/ARW-26Y and R-196D/ARW-26Y. It is not recommended that the filters be tested as individual components. Audio filters should be replaced if they prove to be defective by the check recommended in the service handbook.

6-13. INSPECTION OF MECHANICAL PARTS AND INTERNAL WIRING. Inspect mechanical parts and internal wiring as follows:

a. Inspect all tube and relay sockets, connector receptacles, wire connections to connector pins, and all screws and nuts. Inspect terminal boards, switch, transformer and ground terminal for tight connections to main chassis, the power supply, and the radio frequency tuning unit. Inspect wire and terminal board connections of all electronic components. Inspect all wiring at connectors, relays, and tube socket pin connections, and remaining internal wiring.

b. Look for signs of chafing in the interconnecting wiring. Look for loose connections, kinked and worn wires, insulation, and proper grounding of regular and shielded wiring.

SECTION VII

REPAIR AND REPLACEMENT

7-1. GENERAL.

7-2. This section describes the procedures necessary for repair and replacement of parts within the Radio Receiver-Selector R-196C/ARW-26Y. Repair instructions are limited to those required for repair of the wire-wound inductances and for reactivation of dehydrator silica-gel crystals. This is occasioned by the fact that remaining parts such as capacitors, resistors, electron tubes, relays, filters, transformer and vibrator are sealed units and repair of such parts is normally considered impracticable at any maintenance or overhaul level. Also, mechanical parts of the R-196C/ARW-26Y are not of the moving or rotating type and are therefore not subject to wear. Such items should be replaced if they incur damage, unless the damage is so extensive as to suggest retirement of the unit from service. Replacement instructions are provided for all parts of the receiver unless such replacement is considered obvious.

7-3. REPAIR.

7-4. The subsequent paragraphs outline the procedures necessary for repair of wire-wound components L-101, L-102, L-103 and L-104, and for reactivation of silica-gel crystals contained within the dehydrator. In the case of the inductances, it is assumed that these parts have been damaged sufficiently to necessitate complete fabrication by overhaul activities.

7-5. REPAIR OF RADIO FREQUENCY COIL L-101. Coil L-101 consists essentially of a single layer wound, untapped, unshielded inductance. Fabrication of coil L-101 can be accomplished as follows:

a. Prepare a dowel of any suitable material with an outside diameter of 0.31 inch. The dowel may be cut to any suitable length in excess of one inch.

b. Wind nine full turns of No. 18 AWG SVHF solid wire "Heavy Formovar" (Anaconda Wire and Cable Co., New York, N. Y.) or equivalent, about the dowel.

c. Extend both coil wire ends at right angles to the dowel axis and cut to a length of approximately 0.87 inch from the outside diameter of the coil.

d. Clean insulation from both of the coil wire ends. The length of the uninsulated portions should be approximately 0.56 inch. Tin the uninsulated coil wire ends with solder.

e. Compress the nine turns of wire together and apply

a coat of 9/12 coil cement (American Phenolic Corp., Chicago, Ill.) or equivalent, to the coil turns.

f. Allow the cement to dry and remove the dowel. This completes fabrication of coil L-101. The coil can be replaced by soldering the tinned wire ends to corresponding terminals of the r-f tuning unit.

7-6. REPAIR OF RADIO FREQUENCY CHOKES L-102 AND L-103. Chokes L-102 and L-103 consist essentially of single layer, untapped, unshielded inductances wound about the body of a standard one-half watt composition resistor. Fabrication of chokes L-102 and L-103 can be accomplished as follows:

a. Obtain a standard one-half watt composition resistor with a resistance value of three megohms or greater.

b. Wind 62 full turns of No. 36 AWG enameled copper wire about the resistor body.

c. Clean the insulation from the coil wire ends and wind two or three turns of each uninsulated wire end about the corresponding resistor leads.

d. Solder the uninsulated wire ends to the resistor leads and cut the excess wire. This completes fabrication of chokes L-102 and L-103. The chokes can be replaced by soldering the resistor leads to corresponding terminals within the R-196C/ARW-26Y.

7-7. REPAIR OF RADIO FREQUENCY CHOKE L-104. Choke L-104 consists essentially of a single layer, untapped, unshielded inductance wound about the body of a standard one watt composition resistor. Fabrication of choke L-104 can be accomplished as follows:

a. Obtain a standard one watt composition resistor with a resistance value of three megohms or greater.

b. Wind 60 full turns of No. 32 AWG enameled copper wire about the resistor body.

c. Clean the insulation from the coil wire ends and wind two or three turns of each uninsulated wire end about the corresponding resistor lead.

d. Solder the uninsulated wire ends to the resistor leads and cut the excess wire. This completes fabrication of choke L-104. The choke can be replaced by soldering the resistor leads to corresponding terminals within the R-196C/ARW-26Y.

7-8. REACTIVATION OF DEHYDRATOR SILICA-GEL CRYSTALS. Reactivation of silica-gel crystals at the overhaul level is recommended only as an emergency measure. The dehydrator should be replaced as a unit unless a substitute dehydrator is not available. Reactivate the silica-gel crystals as follows:

a. Saw or cut the dehydrator cartridge end and remove the silica-gel crystals.

b. Place removed crystals in a suitable pan or other flat container and heat in an oven at a temperature 117°C (350°F) until the silica-gel crystals assume a deep blue color.

CAUTION

Do not exceed a temperature of 204°C (400°F) when heating the silica-gel crystals or their moisture absorbing activity may be permanently impaired. Also, it is advisable to stir the silica-gel crystals so that all are evenly heated.

c. Thoroughly dry the interior of the dehydrator cartridge. Refill the cartridge with the reactivated silica-gel crystals and cement the cartridge end in place.

7-9. REPLACEMENT.

7-10. The subsequent paragraphs outline the procedures necessary for replacement of R-196C/ARW-26Y parts. Replacement of parts can be accomplished by disassembling the unit in accordance with the instructions found in Section IV, substituting new parts, and reassembling the unit in accordance with the instructions found in Section VIII and Section X. However, it may prove convenient in certain phases of overhaul to replace individual parts without extensive disassembly of other parts. Figures 4-1 through 4-6 and figure 7-1 can be used as an aid in the replacement of parts and are to be used as a supplement to the subsequent paragraphs.

7-11. REPLACEMENT OF R-F TUNING UNIT. (See figures 4-2 and 7-1.) Replace the r-f tuning unit as follows:

a. (See figure 4-2.) Remove screws (15) from r-f tuning unit and inserts and chassis (57) bottom.

b. Carefully lift r-f tuning unit from the chassis (57) top. Exercise caution when passing the r-f tuning unit electron tube V-101 through the chassis (57) mounting holes. (See figure 7-1.)

c. Position the replacement r-f tuning unit on the chassis (57) top so that electron tube V-101 and the r-f tuning unit inserts match the chassis mounting holes. Make certain that the r-f tuning unit connector plug P-101 is aligned with the mating chassis connector receptacle (37) J-101.

d. Replace screws (15) through the chassis (57) bottom and into the r-f tuning unit inserts. Tighten screws (15) so that the r-f tuning unit is drawn up against the chassis (57) and that the connector plug P-101 is making full contact with connector receptacle J-101.

7-12. REPLACEMENT OF VIBRATOR. (See figure 4-2.) Replace the vibrator as follows:

a. The vibrator (13) is of the plug-in type and can be removed simply by pulling upward on the vibrator while holding chassis (57) until the vibrator contact pins disengage from socket (49).

b. Position the replacement vibrator over socket (49) so that the vibrator contact pins and key mate with the corresponding socket contacts and keyway. Insert vibrator contact pins into socket (49).

7-13. REPLACEMENT OF ELECTRON TUBES AND RELAYS. (See figure 4-2.) The subsequent instructions are applicable to both electron tubes and relays. Replace the electron tubes and relays as follows:

a. Remove the shields (1 and 7) from the corresponding electron tube or relay by rotating the shields counterclockwise and lifting the shield clear of the corresponding socket.

b. Extract the electron tube or relay to be replaced with the aid of a miniature electron tube puller.

c. Position the replacement electron tube or relay over the corresponding socket so that the contact pins match the socket contacts, and insert the electron tube or relay into the corresponding socket with the aid of a miniature electron tube puller.

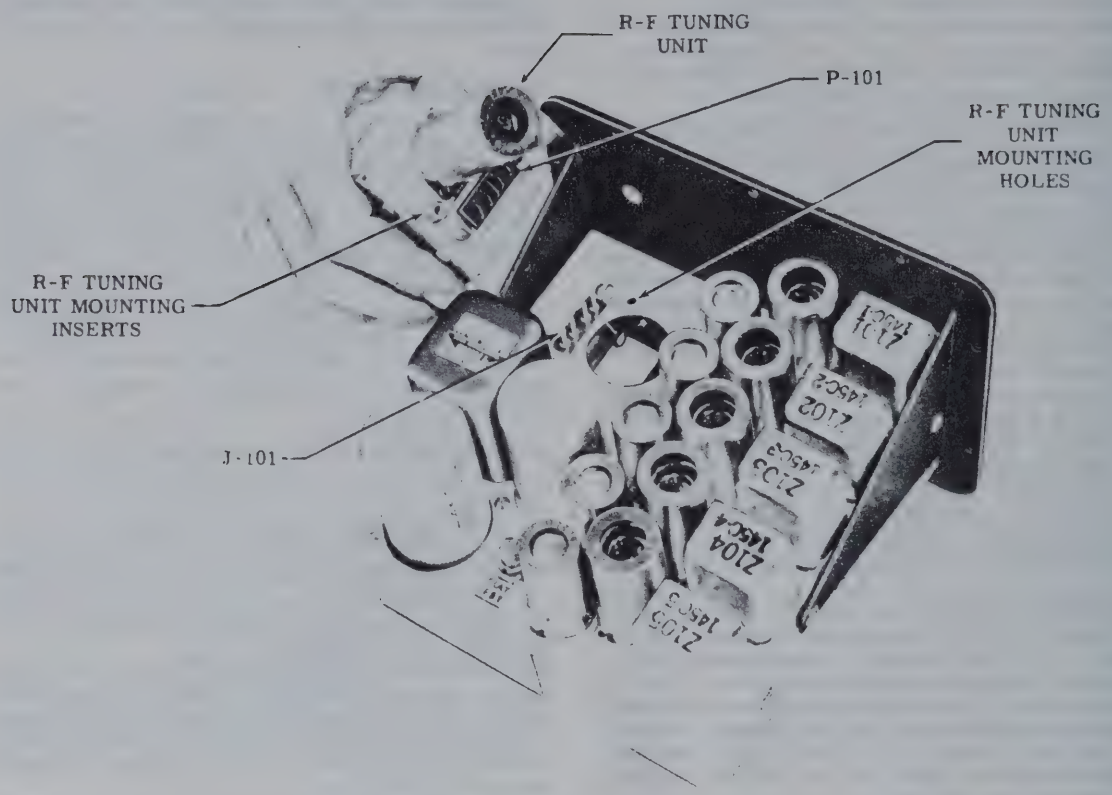


Figure 7-1. Removing and Replacing Radio Frequency Tuning Unit

CAUTION

Exercise extreme care when removing or replacing electron tubes and relays so as not to bend or damage the delicate contact pins. Contact pins for both the electron tubes and relays are of the miniature type and are easily subject to breakage. Always employ a miniature electron tube puller and use a gentle rotating motion to remove and replace these parts.

d. Replace the shields (1 and 7) on the corresponding electron tube or relay sockets and secure by rotating the shields clockwise.

7-14. REPLACEMENT OF TRANSFORMER. (See figure 4-2.) Replace the transformer as follows:

a. Tag and unsolder all electrical leads secured to transformer (19) terminals.

b. Remove attaching nuts and washers from transformer (19) mounting studs.

c. Lift transformer (19) from chassis (57) top.

d. Position replacement transformer (19) over the chassis (57) top so that the transformer mounting studs and terminals match the chassis mounting holes.

e. Insert the transformer (19) mounting studs through the chassis (57) mounting holes and replace attaching nuts and washers.

NOTE

Terminal board (18) and terminal lugs (20) are secured by the transformer (19) attaching nuts and washers. Terminal board (18) and terminal lugs (20) must be placed over the inboard transformer mounting studs and below the corresponding washers when replacing transformer (19).

f. Solder all electrical leads to the corresponding transformer (19) terminals as indicated by the lead tags. Remove the lead tags.

7-15. REPLACEMENT OF AUDIO FILTERS. (See figure 4-2.) Replace the audio filters as follows:

a. Tag and unsolder all electrical leads from the audio filter (23, 24, 25, 26 or 27) to be replaced.

b. Remove attaching nuts and washers from the audio filter to be replaced.
c. Lift the audio filter from the chassis (57) top.
d. Position the replacement audio filter over the chassis (57) top so that the audio filter mounting studs and terminals match the chassis mounting holes.
e. Insert the audio filter mounting studs through the chassis (57) mounting holes and replace attaching nuts and washers.

NOTE

Terminal lugs (28) are secured to the mounting studs of audio filters (23 and 27) by attaching nuts and washers. Terminal lugs (28) must be placed over the inboard mounting studs of audio filters (23 and 27) and below the corresponding washers when replacing audio filters (23 and 27).

f. Solder all electrical leads to the corresponding audio filter terminals as indicated by the lead tags. Remove the lead tags.

7-16. REPLACEMENT OF CAPACITORS AND RESISTORS. (See figures 4-2, 4-3, 4-4, 4-5 and 4-6.) Replace the capacitors and resistors as follows:
a. Individual capacitors and resistors can be easily replaced by unsoldering their leads from the corresponding terminals and soldering the leads of replacement parts in their place. The only capacitors and resistors that may prove difficult to replace are those located between the terminal board and the chassis. (See figure 4-2, Index No. 35.)
b. To replace such capacitors and resistors, remove attaching screws, nuts, washers, and spacers. The terminal board (35) can then be moved to an accessible position. The various electrical leads that connect terminal board (35) with other parts mounted on the chassis (57) need not be unsoldered when moving the terminal board. The terminal board must be returned to its normal configuration upon completion of capacitor or resistor replacement.

7-17. REPLACEMENT OF CONNECTOR RECEPTACLES. (See figure 4-2.) Replace the connector receptacles as follows:
a. Tag and unsolder all electrical leads from the connector receptacle to be replaced.
b. To replace connector receptacle (37), remove attaching screws, nuts, and washers. Lift the connector receptacle from the chassis (57) bottom.
c. Position the replacement connector receptacle (37) over the chassis (57) bottom so that the connector receptacle mounting holes match the chassis mounting holes and the contact pins extend through to the chassis top.
d. Insert attaching screws from the chassis top and replace nuts and washers.
e. Solder all electrical leads to the corresponding connector receptacle (37) terminals as indicated by the lead tags. Remove the lead tags.
f. To replace connector receptacles (52, 53, 54 or 55), remove attaching nuts and gaskets. Pass and remove the connector receptacles toward the chassis (57) interior.
g. Position the replacement connector receptacles within the panel (56) mounting holes so that the connector receptacle keys face the panel (56) bottom.
h. Replace attaching nuts and gaskets from the panel (56) front.
i. Solder all electrical leads to the corresponding connector receptacle (52, 53, 54 or 55) terminals as indicated by the lead tags. Remove the lead tags.

7-18. REPLACEMENT OF DEHYDRATOR. (See figure 4-1.) Replace the dehydrator as follows:
a. Remove screw (6) and washer (7) from case (1) mounting bracket and threaded end of dehydrator (5).
b. Remove dehydrator (5) from case (1) interior.
c. Position the replacement dehydrator (5) within the case (1) interior so that the threaded end of the dehydrator is aligned with the case (1) mounting bracket and the opposite end is placed over the case (1) mounting stud.
d. Pass washer (7) over screw (6) and insert screw (6) through the case (1) mounting bracket into the threaded end of dehydrator (5).

7-19. REPLACEMENT OF R-F TUNING UNIT ADJUSTMENT CORE. (See figure 4-3.) Replace the r-f tuning unit adjustment core as follows:
a. Remove screws (4) and separate cover (3) from chassis (18).
b. Remove spring (9) and unscrew bearing (10) from chassis (18).
c. Pass core (11) and bearing (10) from chassis (18) mounting hole.
d. Separate the core (11) from the bearing (10) by unscrewing the bearing from the core shaft.
e. Insert replacement core (11) within the bearing (10) and screw bearing part way on the core shaft.
f. Pass the core (11) through the chassis (18) mounting hole into the r-f tuning unit inductance L-104. Screw bearing (10) into the chassis (18) mounting hole.
g. Replace cover (3) on chassis (18) and secure with screws (4).

SECTION VIII

REASSEMBLY AND TESTING OF SUBASSEMBLIES AND ASSEMBLIES

8-1. GENERAL.

8-2. This section describes the procedures necessary for reassembly of the Radio Receiver-Selector R-196C/ARW-26Y subassemblies and assemblies from detail parts. Figures 4-3 through 4-6 are provided to serve as a guide when performing both disassembly and reassembly of the R-196C/ARW-26Y and the subsequent paragraphs can be used as a supplement to these illustrations. Reassembly of the R-196C/ARW-26Y subassemblies and assemblies can be accomplished by replacing parts in the reverse order of index numbers assigned to the parts on the illustrations. Detailed instructions are provided only where it is felt that the reassembly method is not obvious.

8-3. No test or minimum performance standards information is provided for the subassemblies and assemblies of the R-196C/ARW-26Y due to the relatively simple nature of the equipment and since it is felt that these items can best be tested when the equipment is in its final assembled configuration.

8-4. REASSEMBLY OF SUBASSEMBLIES AND ASSEMBLIES.

8-5. Reassemble the R-196C/ARW-26Y subassemblies and assemblies as follows:

a. (See figure 4-6.) Individual electronic parts can be replaced on board and lug assembly (24) by soldering the respective leads to the corresponding terminals.

b. (See figure 4-5.) Individual capacitors can be replaced on board and lug assembly (4) by soldering the respective lead to the corresponding terminals. Make certain to observe polarity when replacing electrolytic capacitor (3).

c. (See figure 4-4.) Individual electronic parts can be replaced on board and eyelet assembly (10) by soldering the respective leads to the corresponding terminals.

NOTE

When replacing capacitors or resistors, maintain lead lengths at a minimum. Cut away excess portion of leads after the parts are soldered in place. Employ sufficient heat and solder to insure a good solder connection when replacing electronic parts.

d. (See figure 4-3.) Place connector (14) on chassis (18) mounting holes so that connector solder terminals face chassis interior and replace attaching screws, nuts and washers.

NOTE

All electrical leads which were removed at disassembly must be soldered to the appropriate terminals of corresponding parts at the time of reassembly. This action will be facilitated if such leads were properly tagged during disassembly. The lead tags should be left on until after the solder connections have been made.

e. Place board assembly (12) within chassis (18) interior and secure with screws, nuts, washers and spacers. Make certain to replace terminal (13) on the appropriate attaching screw.

f. Replace core (11) in bearing (10) and screw bearing (10) into chassis (18) mounting hole. Replace spring (9) on bearing (10).

g. Place cover (3) on chassis (18) and secure with screws (4).

h. Replace electron tube (2) in socket (15) with the aid of a miniature electron tube puller. Place shield (1) on socket (15) and secure with clockwise rotation.

i. This completes reassembly of R-196C/ARW-26Y subassemblies and assemblies. Such parts should be replaced in the R-196C/ARW-26Y at the time of final assembly as outlined in Section X.

SECTION IX

REASSEMBLY AND TESTING OF COMPONENTS

Not Applicable

SECTION X

FINAL REASSEMBLY

10-1. GENERAL.

10-2. This section describes the procedures necessary for final reassembly of the Radio Receiver-Selector R-196C/ARW-26Y into a complete unit ready for inspection and final test. Figures 4-1 and 4-2 are provided to serve as a guide when performing both disassembly and reassembly of the R-196C/ARW-26Y and the subsequent steps can be used as a supplement to these illustrations. Reassembly of the R-196C/ARW-26Y can be accomplished by replacing parts in the reverse order of index numbers assigned to the parts on the illustrations. Detailed instructions are provided only where it is felt that the reassembly method is not obvious.

10-3. FINAL REASSEMBLY.

10-4. Reassemble the R-196C/ARW-26Y as follows:

a. (See figure 4-2.) Secure panel assembly (56) to chassis (57) by passing attaching screws through the panel assembly (56) mounting holes into inserts located on the chassis (57).

b. Place connectors (52, 53, 54 and 55) in panel assembly (56) mounting holes and secure with attaching nuts and gaskets.

NOTE

All electrical leads which were removed at disassembly must be soldered to the appropriate terminals of corresponding parts at the time of reassembly. This action will be facilitated if such leads were properly tagged during disassembly. The lead tags should be left on until after the solder connections have been made.

c. Pass attaching screws through appropriate chassis (57) mounting holes and place spacers over the screws. Position socket (49) mounting holes over screws and secure socket with nuts and washers.

d. Place connector (37) on chassis (57) mounting holes so that connector solder terminals face chassis interior and replace attaching screws, nuts and washers.

e. Place board assembly (36) within chassis (57) interior and secure with screws, nuts, washers and spacers.

f. Place board assembly (35) within chassis (57) interior and secure with screws, nuts, washers and spacers.

g. Position filters (23, 24, 25, 26 and 27) on chassis (57) top so that filter mounting studs and solder terminals pass through appropriate chassis mounting holes. Secure filters with attaching nuts and washers. Make certain to replace terminals (28) over the inboard mounting studs of filters (23 and 27) and under the corresponding washers.

h. Position transformer (19) on chassis (57) top so that transformer mounting studs and solder terminals pass through the appropriate mounting chassis holes. Secure transformer with attaching nuts and washers. Make certain to replace terminals (20) and terminal board (18) over the inboard mounting studs of transformer (19) and under the corresponding washers. Capacitor (17) must be soldered to terminal board (18) if it was removed at the time of disassembly.

i. Position r-f tuning unit (14) on the chassis (57) top so that the r-f tuning unit inserts match the chassis mounting holes. Make certain that the r-f tuning unit connector plug P-101 is aligned with the mating chassis connector receptacle (37) J-101. Pass screws (15) through chassis (57) bottom and into the r-f tuning unit inserts. Tighten screws (15) so that the r-f tuning unit is drawn up against the chassis (57) and that the connector plug P-101 is making full contact with connector receptacle J-101.

j. Position vibrator (13) over socket (49) so that the vibrator contact pins and key mate with the corresponding socket contacts and keyway. Insert vibrator contact pins into socket (49).

k. Replace electron tubes (2, 3, 4, 5 and 6) in sockets (38, 39, 40, 41 and 42) and relays (8, 9, 10, 11 and 12) in sockets (43, 44, 45, 46 and 47) with the aid of a miniature electron tube puller. Place shields (1 and 7) on corresponding sockets and secure with clockwise rotation.

l. (See figure 4-1.) Position dehydrator (5) within case (1) interior so that the threaded end of the dehydrator is aligned with the case mounting bracket and the opposite end is placed over the case mounting stud. Secure dehydrator (5) with screw (6) and washer (7).

m. Place gasket (4) over case (1) flange and slide panel and chassis assembly (8) into case (1) interior. Position brackets (2) on panel and chassis assembly (8) so that the bracket mounting holes are aligned with the panel mounting holes. Secure the brackets (2), panel and chassis assembly (8) and case (1) with the ten attaching screws (3). Cinch down on screws (3) to compress gasket (4) and to insure a watertight seal within the case (1) interior. This completes final reassembly of the R-196C/ARW-26Y.

SECTION XI

INSPECTION, TESTING AND PACKAGING

11-1. GENERAL.

11-2. Marking of equipments required by Government technical orders or other instructions, to indicate overhaul, or incorporation changes, shall be applied during inspection and test (if not previously applied to subassemblies, or components during overhaul and assembly).

11-3. Upon completion of final reassembly, the equipment will be subjected to final inspection and test. A final inspection will be made by checking the mechanical parts for completion of reassembly, the wiring, and component parts for connections. Refer to the practical wiring diagram, and the master schematic diagram in the Handbook of Service Instructions Radio Receiver-Selector R-196C/ARW-26Y and R-196D/ARW-26Y. When there is any doubt concerning the wiring, check the practical wiring diagram against the master schematic diagram.

11-4. Testing and alignment procedure will follow the completion of final inspection according to minimum performance standards and maintenance procedures outlined in the Handbook of Service Instructions Radio Receiver-Selector R-196C/ARW-26Y and R-196D/ARW-26Y.

11-5. When it has been determined that proper operation is obtained, the equipment will be reinstalled in the target drone or packaged for use and reshipment as outlined in the service handbook.

SECTION XII

DIFFERENCE DATA SHEET

RADIO RECEIVER-SELECTOR R-196D/ARW-26Y

CONTRACT NO. AF33 (038) -17388

THE INSTRUCTIONS CONTAINED IN THE PRECEDING SECTIONS OF THIS HANDBOOK APPLY EXCEPT FOR DIFFERENCES GIVEN IN THIS DATA SHEET

12-1. DESCRIPTION AND LEADING PARTICULARS. (See figure 12-1.)

12-2. Same as for R-196C/ARW-26Y with the following exceptions. The power supply components are different and these differences are incorporated in Table III.

12-3. TEST EQUIPMENT AND SPECIAL TOOLS.

12-4. Same as for R-196C/ARW-26Y.

12-5. MAINTENANCE BEYOND CAPABILITIES OF FIELD.

12-6. Same as for R-196C/ARW-26Y.

12-7. DISMANTLING AND DISASSEMBLY.

12-8. Same as for R-196C/ARW-26Y with the following exceptions. Figures 12-2 through 12-5 are substituted for figures 4-2 through 4-6. Figure 4-1 is common for both models. The following differences occur in disassembly of the panel and chassis assembly. (See figure 12-2.) Remove cover (16) from shield (61) by extracting screws (17). Unsolder leads of r-f chokes (18, 19 and 20), and capacitors (21, 25, 26, 27, 28, 29, 30, 31 and 33), and resistor (32). Remove transformer (22) and terminal (23) by removing attaching nuts and washers. Remove terminal board (24) by removing attaching screw, nut and washer. Instructions pertaining to removal of capacitor terminal board assembly (see figure 4-2, Index No. 36) are not applicable to the R-196D/ARW-26Y.

12-9. CLEANING.

12-10. Same as for R-196C/ARW-26Y.

12-11. INSPECTION OF DISASSEMBLED EQUIPMENT.

12-12. Same as for R-196C/ARW-26Y with the following exceptions. Primary and secondary winding resistances for R-196D/ARW-26Y transformer T-101 should be 15 ohms and 160 ohms respectively.

12-13. REPAIR AND REPLACEMENT.

12-14. Same as for R-196C/ARW-26Y with the following exceptions. Fabrication of additional r-f chokes L-105 and L-106 will be required for R-196D/ARW-26Y. Fabricate r-f choke L-105 as follows:

a. Wind 180 full turns of No. 30 AWG enameled copper wire about an iron core form CFI-280 (Speer Carbon Co., St. Marys, Pa.) in three layers (60 turns per layer).

b. Clean the insulation from the coil wire ends and wind two or three turns of each uninsulated wire end

TABLE III

EQUIPMENT CHARACTERISTICS FOR R-196D/ARW-26Y

POWER SUPPLY DATA	
Type	Full-wave, synchronous vibrator and transformer
Type Number and Manufacturer	
Vibrator	M3335C-5, Cornell-Dubilier Electric Corp.
Transformer	7088, Triad Transformer Co.
Input Requirements	+26.5 volts dc at 0.3 ampere
Power Supply Output	Approximately +225 volts dc at 20 milliamperes

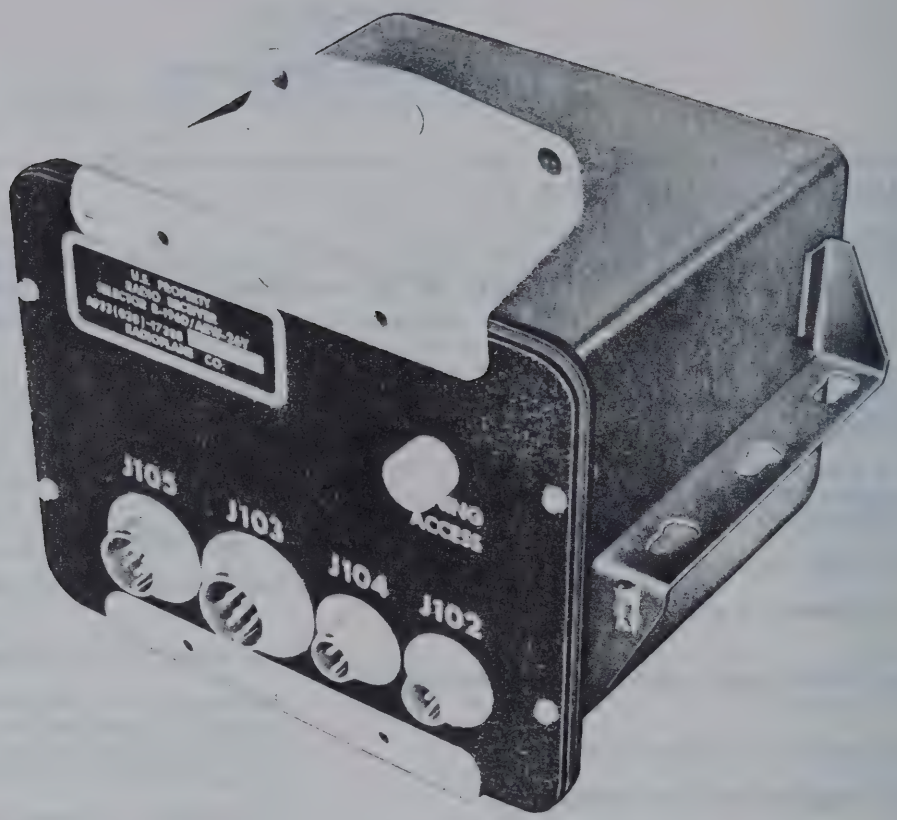


Figure 12-1. Radio Receiver-Selector R-196D/ARW-26Y, Assembled View

KEY TO FIGURE 12-2

Index	Description	Reference Designation	Index	Description	Reference Designation
1.	Shield	E-102	17.	Screw	
2.	Tube	V-102	18.	Choke	L-104
3.	Tube	V-103	19.	Choke	L-105
4.	Tube	V-104	20.	Choke	L-106
5.	Tube	V-105	21.	Capacitor	C-118
6.	Tube	V-106	22.	Transformer	T-101
7.	Shield	E-103	23.	Terminal	E-107
8.	Relay	K-101		Nut	
9.	Relay	K-102		Washer	
10.	Relay	K-103	24.	Terminal Board	TB-101
11.	Relay	K-104		Screw	
12.	Relay	K-105		Washer	
13.	Vibrator	CR-101		Nut	
14.	Tuning Unit Assy	E-101	25.	Capacitor	C-121
15.	Screw		26.	Capacitor	C-127
16.	Cover	A-115	27.	Capacitor	C-125

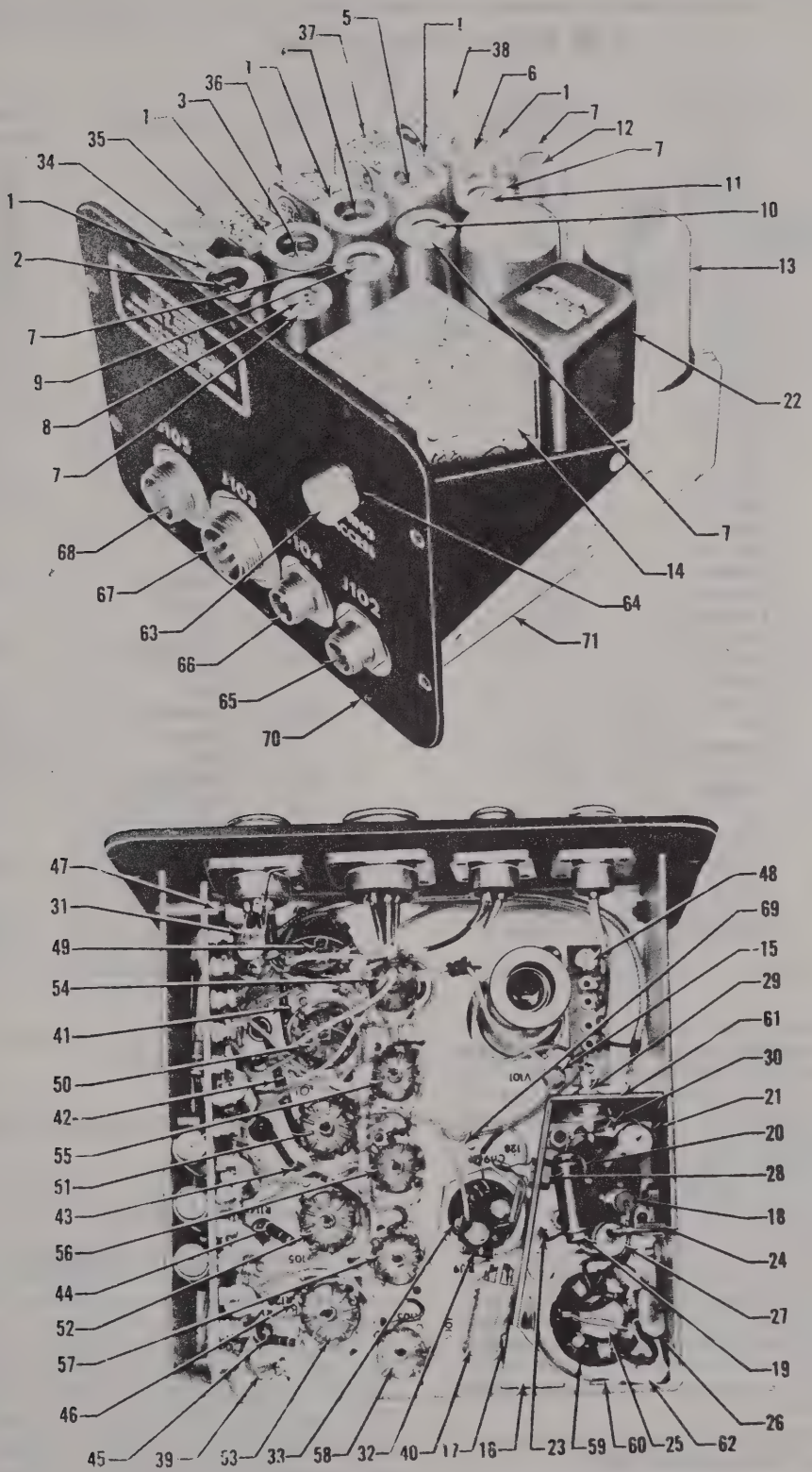


Figure 12-2. Panel and Chassis Assembly, Part No. 22887

KEY TO FIGURE 12-2 (cont)

Index	Description	Reference Designation
28.	Capacitor	C-128
29.	Capacitor	C-122
30.	Capacitor	C-130
31.	Capacitor	C-126
32.	Resistor	R-119
33.	Capacitor	C-119
34.	Filter	Z-101
35.	Filter	Z-102
36.	Filter	Z-103
37.	Filter	Z-104
38.	Filter	Z-105
39.	Terminal	E-107
	Washer	
	Nut	
40.	Switch	S-101
41.	Resistor	R-111
42.	Resistor	R-112
43.	Resistor	R-113
44.	Resistor	R-114
45.	Resistor	R-115
46.	Resistor	R-120
47.	Board Assy	E-105
	Screw	
	Spacer	
	Washer	
	Nut	
48.	Connector	J-101
	Screw	
	Washer	
	Nut	
49.	Socket	XV-102
50.	Socket	XV-103
51.	Socket	XV-104
52.	Socket	XV-105
53.	Socket	XV-106
54.	Socket	XK-101
55.	Socket	XK-102
56.	Socket	XK-103
57.	Socket	XK-104
58.	Socket	XK-105
59.	Socket	XCR-101
60.	Clamp	E-106
61.	Shield	A-116
62.	Terminal	E-107
	Screw	
	Spacer	H-104
	Washer	
	Nut	
63.	Cap	A-107
64.	Gasket	A-108
65.	Connector	J-102
	Gasket	
	Nut	
66.	Connector	J-104
	Gasket	
	Nut	
67.	Connector	J-103
	Gasket	
	Nut	
68.	Connector	J-105
	Gasket	A-111
	Nut	H-102
69.	Terminal	E-107
	Screw	
	Washer	
	Nut	
70.	Panel Assy	A-102
	Screw	
	Insert	H-107
71.	Chassis	A-103

about the corresponding core leads.

c. Solder the uninsulated wire ends to the core leads and cut the excess wire. This completes fabrication of r-f choke L-105. The choke can be replaced by soldering the core leads to corresponding terminals within the R-196D/ARW-26Y.

d. Fabricate r-f choke L-106 as follows: Wind two pie windings of No. 38 S.E. copper wire about core form CF-125 (Speer Carbon Co., St. Marys, Pa.) 175 full turns per winding.

e. Clean the insulation from the coil wire ends and wind two or three turns of each uninsulated wire end about the corresponding core leads.

f. Solder the uninsulated wire ends to the core leads and cut the excess wire. This completes fabrication of r-f choke L-106. The choke can be replaced by soldering the core leads to corresponding terminals within the R-196D/ARW-26Y.

12-15. REASSEMBLY AND TESTING OF SUBASSEMBLIES AND ASSEMBLIES.

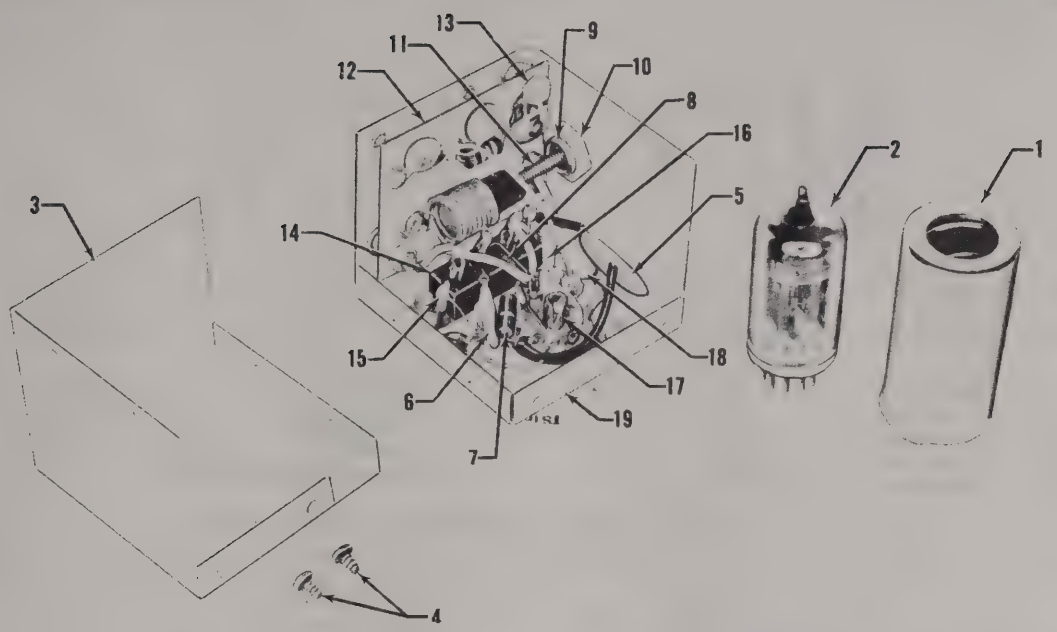
12-16. Same as for R-196C/ARW-26Y with the following exceptions. Figures 12-3 through 12-5 are substituted for figures 4-3 through 4-6.

12-17. REASSEMBLY AND TESTING OF COMPONENTS.

12-18. Not applicable.

12-19. FINAL REASSEMBLY.

12-20. Same as for R-196C/ARW-26Y with the following exceptions. Figure 12-2 is substituted for figure 4-2. Figure 4-1 is common to both models. The following differences occur in final reassembly of the panel and chassis assembly. (See figure 12-2.) Place terminal board (24) over corresponding chassis (71) mounting hole and secure with attaching screw, nut and washer. Place transformer (22) studs in corresponding chassis (71) mounting holes and secure with attaching nuts and washers. Make certain to replace terminals (23) over corresponding transformer (22) studs before replacement of attaching nuts and washers.



Index	Description	Reference Designation	Index	Description	Reference Designation
1.	Shield	E-102		Screw	
2.	Tube	V-101		Nut	
3.	Cover	A-105		Washer	
4.	Screw			Spacer	H-105
5.	Capacitor	C-101			H-106
6.	Capacitor	C-107	14.	Connector	P-101
7.	Resistor	R-101		Screw	
8.	Choke	L-102		Nut	
9.	Spring	A-114		Washer	
10.	Bearing	A-113	15.	Terminal	E-107
11.	Core	A-112	16.	Lockwasher	
12.	Tuning Unit		17.	Socket	XV-101
	Board Assy	E-104	18.	Insert	H-108
13.	Terminal	E-107	19.	Chassis	A-104

Figure 12-3. Radio Frequency Tuning Unit Assembly, Part No. 22889

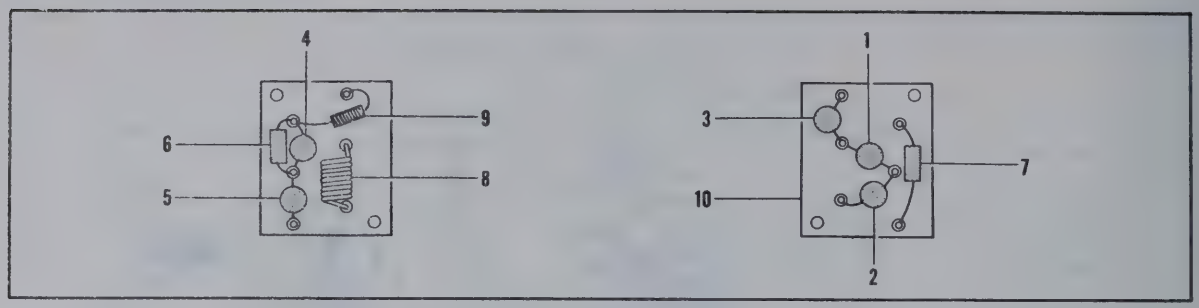
NOTE

Shield (61) is secured to chassis (71) by attaching parts which are also common to transformer (22) and socket (59). Shield (61) should therefore be positioned over the chassis (71) mounting holes before reassembly of transformer (22) or socket (59).

Make certain to resolder leads of r-f chokes (18, 19 and 20), capacitors (21, 25, 26, 27, 28, 29, 30, 31 and 33), and resistor (32) before replacing cover (16) on shield (61). Secure cover (16) to shield (61) with screws (17). Instructions pertaining to replacement of capacitor terminal board assembly (see figure 4-2, Index No. 36) are not applicable to the R-196D/ARW-26Y.

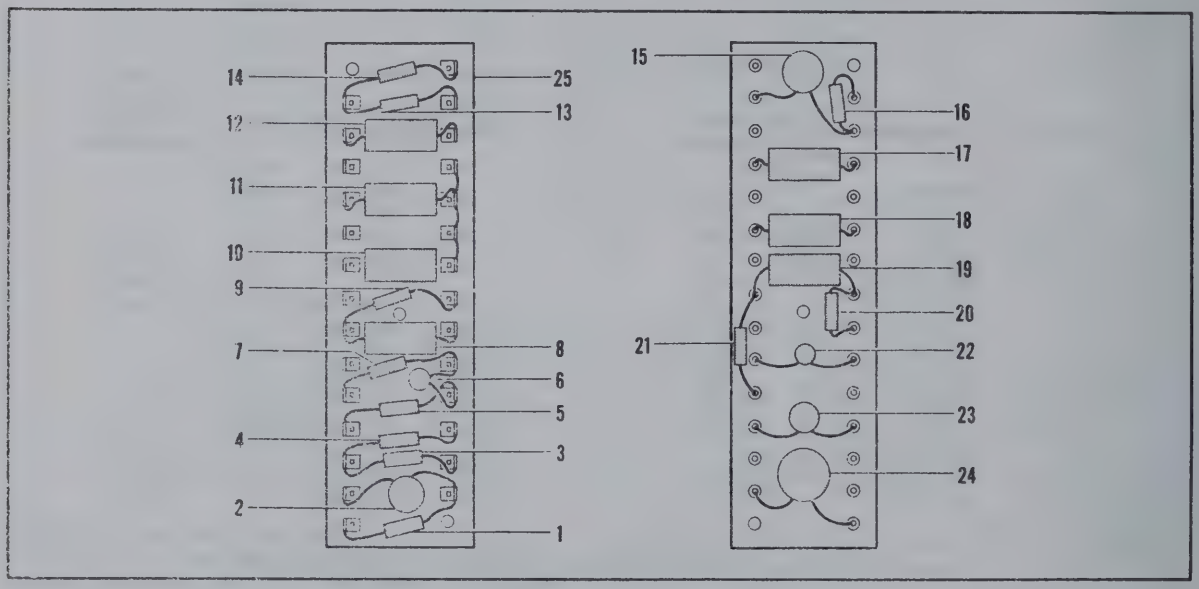
12-21. INSPECTION, TESTING, AND PACKAGING.

12-22. Same as for R-196C/ARW-26Y.



Index	Description	Reference Designation	Index	Description	Reference Designation
1.	Capacitor	C-102	6.	Resistor	R-102
2.	Capacitor	C-103	7.	Resistor	R-103
3.	Capacitor	C-104	8.	Tuning Coil	L-101
4.	Capacitor	C-105	9.	Choke	L-103
5.	Capacitor	C-106	10.	Board and Eyelet Assy	

Figure 12-4. Tuning Unit Terminal Board Assembly, Part No. 22890



Index	Description	Reference Designation	Index	Description	Reference Designation
1.	Resistor	R-104	14.	Resistor	R-117
2.	Capacitor	C-108	15.	Capacitor	C-123
3.	Resistor	R-118	16.	Resistor	R-121
4.	Resistor	R-105	17.	Capacitor	C-117
5.	Resistor	R-106	18.	Capacitor	C-115
6.	Capacitor	C-110	19.	Capacitor	C-113
7.	Resistor	R-108	20.	Resistor	R-109
8.	Capacitor	C-112	21.	Resistor	R-107
9.	Resistor	R-110	22.	Capacitor	C-111
10.	Capacitor	C-114	23.	Capacitor	C-109
11.	Capacitor	C-116	24.	Capacitor	C-124
12.	Capacitor	C-129	25.	Terminal Board and Lug Assy	
13.	Resistor	R-116			

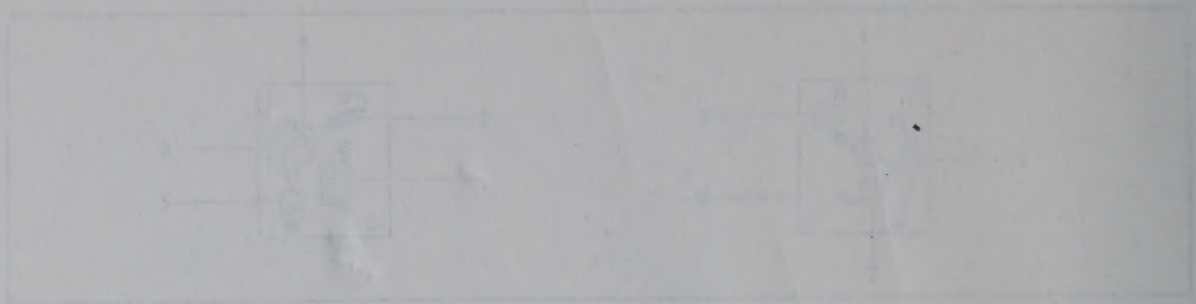



Figure 12-5. Chassis Terminal Board Assembly, Part No. 22885